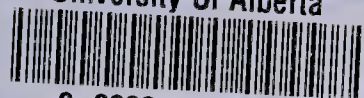


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# THE WESTERN HEMISPHERE



**DRUMMOND**

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OUR WORLD TODAY SERIES



# The Western Hemisphere

*by* HAROLD D. DRUMMOND

1965

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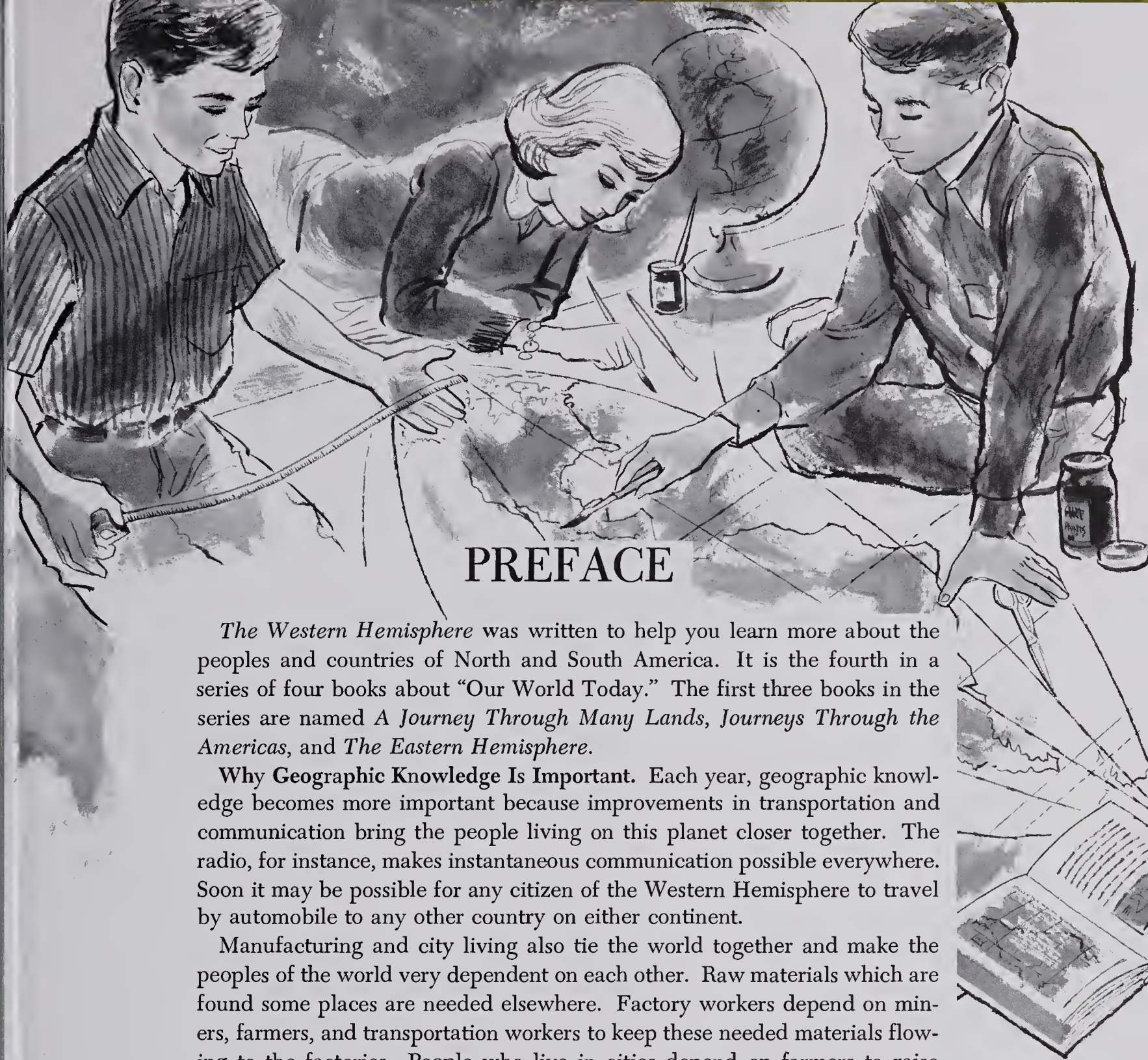
*The Western Hemisphere*, originally written by De Forest Stull and Roy W. Hatch, has been completely revised by the present author, Harold D. Drummond, Chairman, Department of Elementary Education, College of Education, University of New Mexico, Albuquerque, New Mexico.

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## PREFACE

*The Western Hemisphere* was written to help you learn more about the peoples and countries of North and South America. It is the fourth in a series of four books about "Our World Today." The first three books in the series are named *A Journey Through Many Lands*, *Journeys Through the Americas*, and *The Eastern Hemisphere*.

**Why Geographic Knowledge Is Important.** Each year, geographic knowledge becomes more important because improvements in transportation and communication bring the people living on this planet closer together. The radio, for instance, makes instantaneous communication possible everywhere. Soon it may be possible for any citizen of the Western Hemisphere to travel by automobile to any other country on either continent.

Manufacturing and city living also tie the world together and make the peoples of the world very dependent on each other. Raw materials which are found some places are needed elsewhere. Factory workers depend on miners, farmers, and transportation workers to keep these needed materials flowing to the factories. People who live in cities depend on farmers to raise most of their food, and those who live on farms depend on city dwellers to produce manufactured goods.

**Aids to Study.** The author of this book tried to plan it so that you will be helped to learn a great deal about the Western Hemisphere. To help you find information quickly, the book includes a table of contents, a list of maps, graphs, charts and diagrams, and an index. The appendix has tables containing much useful information. Each unit has Question Boxes to help you think about important ideas and exercises to help you learn more about globes and maps.

Many changes are taking place rapidly in the Western Hemisphere. As you use this book, watch for articles in newspapers and magazines about the countries on the two continents. We hope that you will enjoy using this book, and that you will learn a great deal about the Western Hemisphere.

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# THE WESTERN HEMISPHERE

We live in the Western Hemisphere. This book is about our own country and about neighboring countries and peoples in the Western Hemisphere. Before you read further, you might like to make a list of facts you already know about the Western Hemisphere. What continents are in the Western Hemisphere, and what countries are on these continents? What are some important cities in these countries? Where are the large rivers, mountains, and deserts? What do you know about the climates and the resources of the countries? What are the languages and occupations of the people?

**What Is the Western Hemisphere?** As you will remember, hemisphere means *half a sphere*. Do you remember the different ways in which the Earth may be divided into hemispheres? The equator divides the Earth into the Northern Hemisphere and the Southern Hemisphere. Any two continuous meridians of longitude, which form a great circle on the globe, also divide the Earth into hemispheres.

You remember that meridians of longitude are lines drawn north and south between the poles. There are many ways of

dividing the Earth into hemispheres using the meridians. Since a sphere, or circle, contains 360 degrees, a half-sphere or hemisphere has 180 degrees. Therefore,  $0^{\circ}$  Longitude and  $180^{\circ}$  Longitude may be used as a continuous great circle. Another great circle which may be used is  $30^{\circ}$  West Longitude and  $150^{\circ}$  East Longitude. Locate these meridians on your classroom globe, and find other great circles which divide the Earth into hemispheres.

The Northern Hemisphere and the Southern Hemisphere each contain exactly half of the Earth's surface. The terms *Western Hemisphere* and *Eastern Hemisphere* are used with a slightly different meaning, however, because of the location of continents on the Earth. The Western Hemisphere is that portion of the Earth's surface which includes the continents of North America and South America and the main islands near them. The Western Hemisphere thus extends from about  $35^{\circ}$  West Longitude on the east to  $172^{\circ}$  East Longitude on the west. The area of the Western Hemisphere covers less than  $180^{\circ}$  of longitude. More than half the Earth, therefore, is in the Eastern Hemisphere.

The continent of Antarctica has land in both the Eastern and Western Hemispheres, but is closer to South America than to any other continent. For this reason, Antarctica is also considered in this book.

A glance at the map on page 203 will show that the largest island in the world, ice-bound Greenland, is near the North American continent. Although Greenland is near the continent of North America, it has been settled primarily by persons from the European country of Denmark. For that reason, Greenland is considered in the third book of this series, *The Eastern Hemisphere*.

**The Earth and Map Making.** At one time, the Earth was thought to be almost a perfect sphere with the poles slightly flattened. Recent measurements, which have been taken by using man-made satellites, indicate that the Earth is not quite the shape previously thought. It is, of course, a sphere and a very large one, but it is not a perfect sphere. It is shaped a little like a pear, with the south polar area a little broader and flatter, and the north polar area a little more pointed. More accurate measurements of the Earth will continue to be made by scientists in their constant search for knowledge.

As you know, places on the Earth are located by using a **grid**, or system of crossing lines. East-west lines shown on the globe and on maps are called parallels of latitude because they are circles drawn around the globe parallel to each other. The longest parallel of latitude, dividing the Earth into northern and southern hemispheres, is the equator. The parallels are numbered from  $0^{\circ}$  at the equator to  $90^{\circ}$  at the North and South Poles. The parallels  $60^{\circ}$  North and South are one-half the **circumference**, or total distance around, of the equator. Latitude may be expressed in degrees, minutes, and seconds. The latitude of any

place is the measurement of the angle formed by lines drawn from that place to the center of the Earth and to the equator.

The distance around the Earth on any two meridians is about 24,860.49 miles. Since a circle or sphere contains 360 degrees, each degree of latitude equals about 69.1 statute miles or land miles. A degree of latitude near the equator is about 68.7 miles, and near the Poles about 69.4 miles. Can you figure out why? For most measurements, however, using 69.1 miles is accurate enough. Since there are 60 minutes in a degree, each minute equals about 1.15 statute miles. Since there are 60 seconds in one minute, a second of latitude equals about 101 feet.

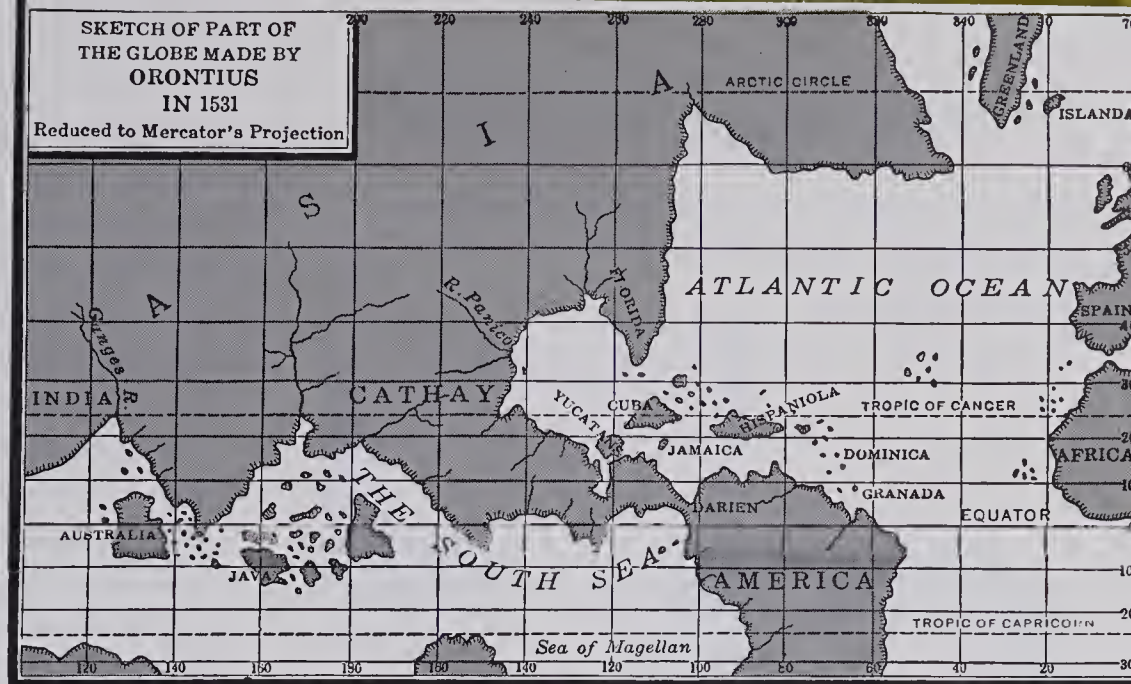
Meridians of longitude, which are drawn from the North Pole to the South Pole, also can be drawn at each degree. The meridians could be drawn at each minute and each second if that much accuracy is desired. On most globes, meridians are drawn each 15 degrees because that is the distance the Earth turns in one hour.

At one time, maps were made using the capital of the country in which the map was drawn as the location for  $0^{\circ}$  Longitude. This caused considerable confusion, as you can understand. Therefore, in 1884, 25 nations agreed that the maps they would make in the future would show the meridian which passes through Greenwich, England, as  $0^{\circ}$  Longitude. As you know, this is called the Prime Meridian and almost all maps and globes now made in the world number longitude eastward and westward from this meridian.

Meridians of longitude are very useful for locating places and for quickly determining the time in a place on the Earth in relation to another time. They are not very useful, however, for determining the distance from one place to another. Meridians meet at the North and South Poles, and are farthest apart at the equator where



Some land areas shown on this 16th century map are accurate; many are not. Can you give any reasons for this? Note where  $0^\circ$  Longitude is drawn. Can you guess from this clue the nation for which this map was drawn?



a degree of longitude approximately equals a degree of latitude. At  $30^\circ$  North or South, however, a degree of longitude is only about 60 miles wide. At  $50^\circ$  North, a degree of longitude is a little less than 45 miles wide. Near the poles, a degree of longitude is only a few feet in width.

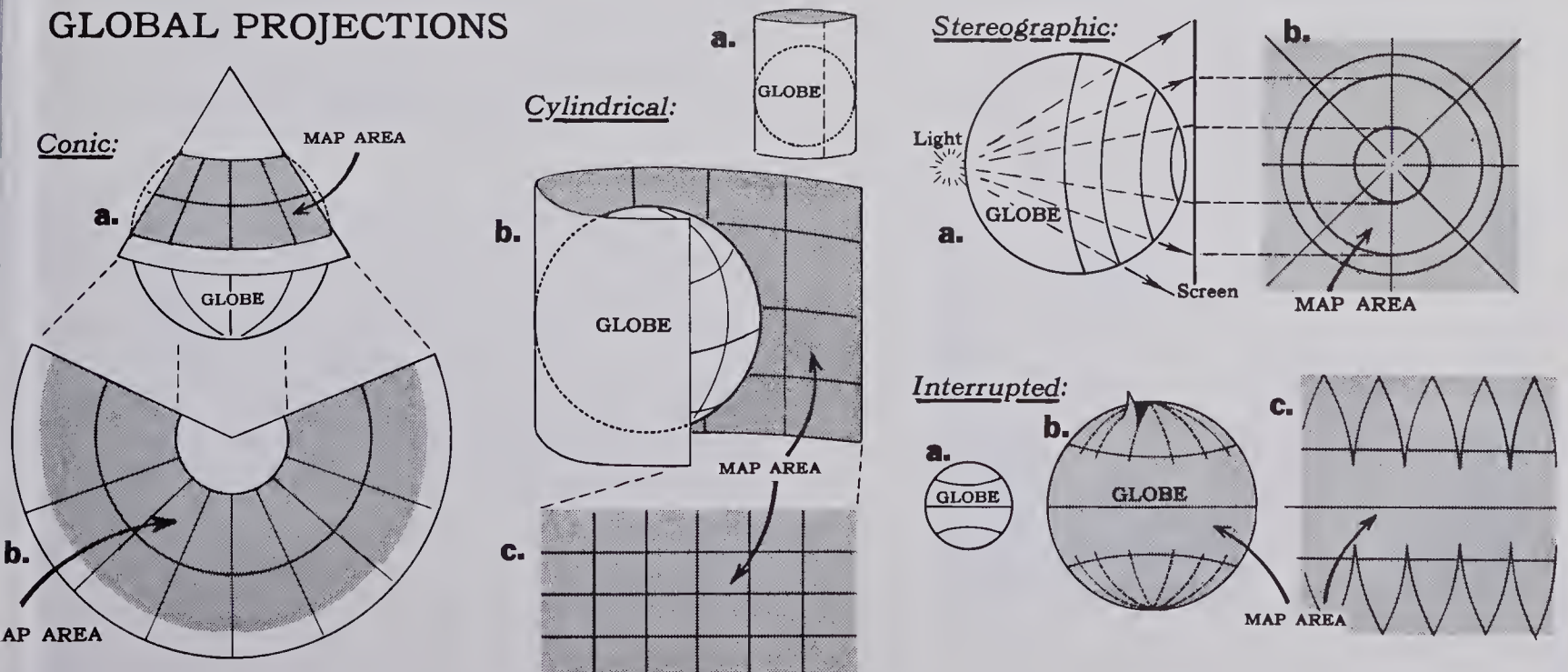
**Map Projections.** For hundreds of years map makers, who are called **cartographers**, have been attempting to make accurate drawings of the Earth on a flat surface. As you know, these drawings are called maps. A map is not as accurate as a globe, because the map is a flat surface and the globe is made in the shape of a sphere. It is almost impossible to make a globe

large enough to show a small area, however. Moreover, large globes are not very usable and they are also quite expensive. Maps of many different kinds have been made, therefore, through the years. No particular kind of map is best for all purposes.

A drawing on a flat surface which shows the grid design of a globe is called a **projection**. One way to understand the term *projection* is to imagine that a light is shining through a transparent globe against a flat screen, cone, or cylinder. The light *projects* the grid lines and land surfaces of the globe onto the screen, cone, or cylinder. The lines and land shapes can then

Below are some of the projections used by mapmakers to show the earth on a flat surface. It is important to remember that no one map projection can correctly show *all* the characteristics of the globe.

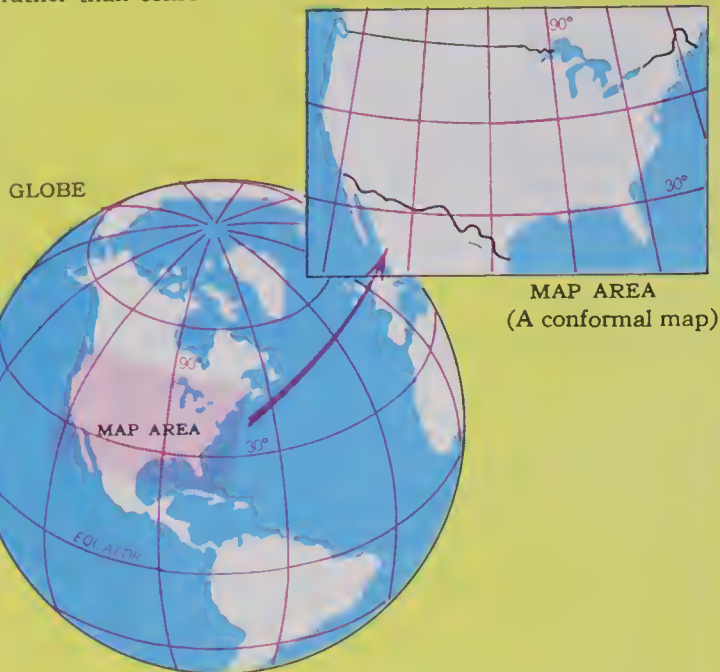
## GLOBAL PROJECTIONS



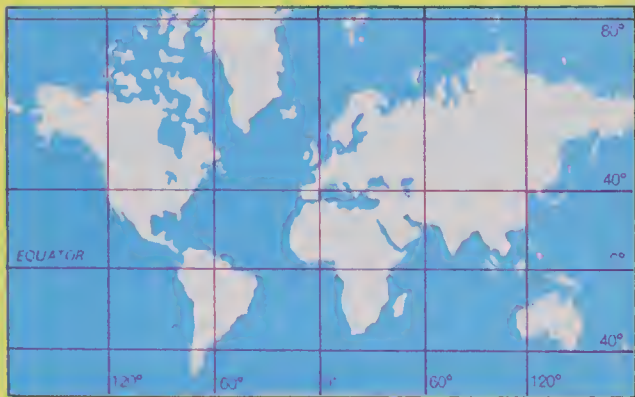


## CONFORMAL PROJECTIONS

Conic and cylindrical projections usually are conformal. Sometimes, conic or cylindrical projections are modified to make them equal-area rather than conformal.



*Mercator Projection (Cylindrical)*



The Mercator map is best used for conformity along the Equator, whereas the Lambert map is best suited in the middle latitudes.

*Lambert Conic Conformal Projection*



be traced to make a map. In actual practice, however, map projections are made mathematically.

Several different map projections are used in this book. For instance, look at the map of South America on page 53. The legend shows that this is a *Parabolic Equal Area Projection*. Then look at the map of the United States on pages 218-219. The legend shows that this map is a *Lambert Conformal Conic Projection*. Lambert was a great cartographer of the 18th century who developed the two types of maps which are the bases for map making today. These basic types are called **conformal** and **equal-area** projections.

A map is conformal when, in any small part of the map, the scale is the same along both the parallels and the meridians. The scale changes, however, over the map as a whole. The angles formed by the parallels and meridians are right angles on a conformal map. Shapes of land areas, distances, and directions are shown fairly accurately. If a small piece cut from a conformal map is enlarged, it looks very much like the same area cut from the surface of a globe and enlarged. Areas cut from different parts of a conformal map, while having the right shape, do not have the right size, however. A conformal map is a good one to use for an area which is long from east to west and fairly short from north to south. Usually, such maps use one scale between two of the main parallels extending across the map. These are called **standard parallels**. A larger

These three projections are all conformal. The Mercator map is a projection onto a cylinder which just fits over and touches the globe only along the equator or any great circle. The equator or great circle is called a *standard parallel*. The areas are fairly accurate near the standard parallel but are much larger near the Poles.



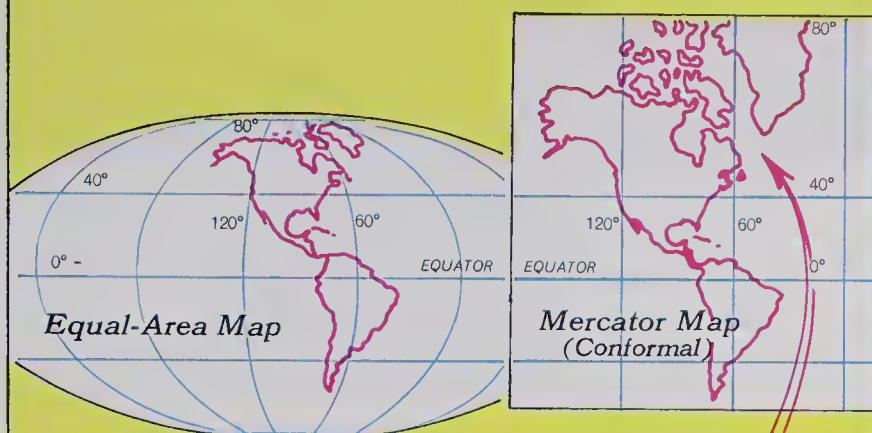
## EQUAL-AREA PROJECTIONS

scale is used both north and south of the standard parallels in order to keep shapes, distances, and directions accurate. If the area being mapped is long from north to south, that part of it outside the standard parallels has to be greatly enlarged.

On an equal-area map, meridians and parallels do not all meet at right angles. Each area formed by a grid pattern has the same area, so far as size is concerned, as it has on the Earth. However, shapes are accurate only near the center of an equal-area map. They are distorted, or squeezed out of shape, toward the edge of the map. Look, for instance, at the size and shape of Greenland on the equal-area projection of North America on page 203. Compare it with the shape of Greenland on the globe. Notice, however, that the shape of 48 of the United States is very similar to that of the same area on the globe. The 48 states are near the center of the map, while Greenland is toward the edge.

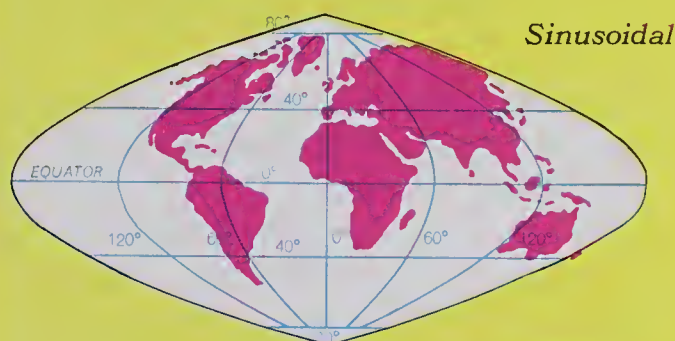
The same map cannot be both conformal and equal area. If it could, a map of the Earth could be made accurately on a flat surface. Notice that on the Lambert Conformal Conic Projection (bottom left), the meridians are straight lines and the parallels are circles drawn with a common center. On the Interrupted Parabolic Equal-Area Projection (bottom right), the parallels are straight lines and the meridians are curved. If bent around a sphere of the right size, this "orange peel" would almost cover it. There are many other conformal and equal-area projections.

Each equal-area map on this page is best suited to show certain features. Sinusoidal maps are often used to show large-scale sectional maps of Africa and South America. Mollweide's projection is used to show the globe as an uninterrupted unit. The Interrupted Parabolic Projection is often used to show the shapes of the continents.

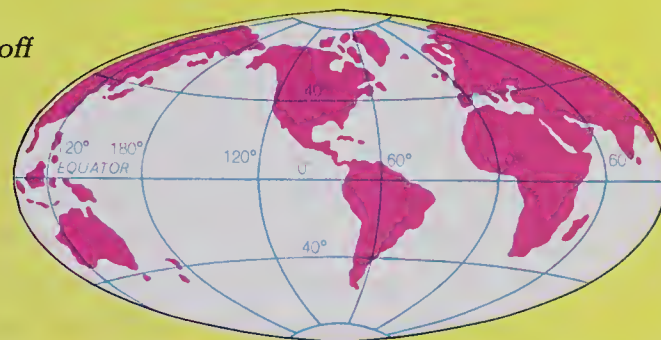


Note how land area is enlarged in comparison with same land area on the equal-area map.

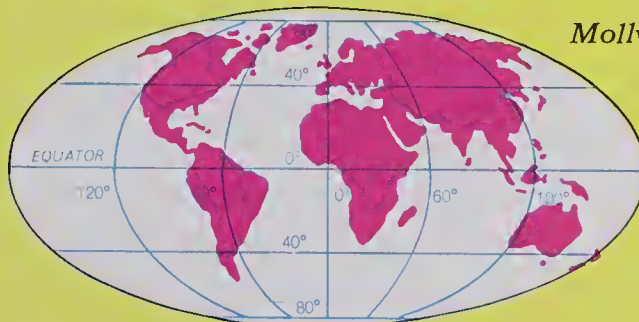
### Examples of Equal-Area Projections:



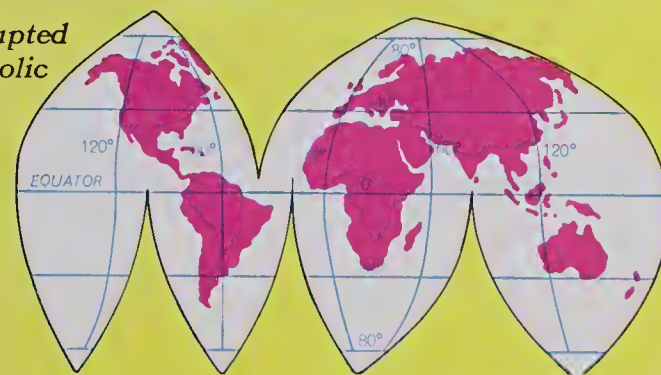
Aitoff



Mollweide



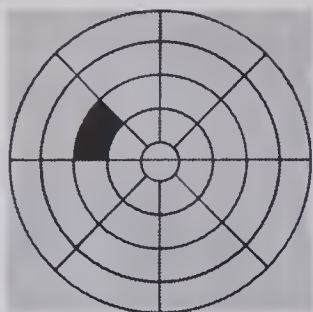
Interrupted Parabolic





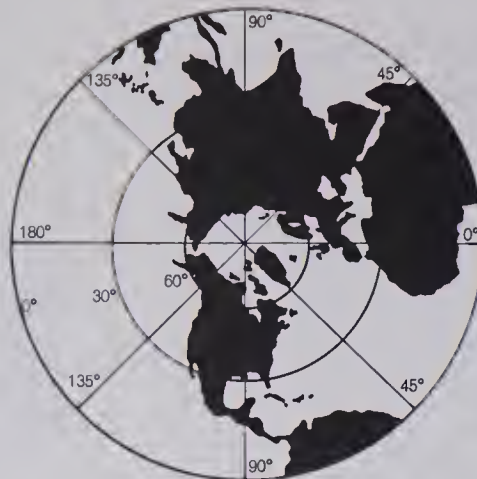


MAP AREA



With the Stereographic Projection any section formed by meridians and parallels remains the same, on both globe and map surface. See figure of map projection methods.

## STEREOGRAPHIC PROJECTIONS



*Polar Projection*



*Equatorial Projection*

On stereographic projections, any block formed by crossing parallels and meridians has the same *shape* as it has on the globe. Blocks formed near the center of the map are about the same size as on the globe, too.


A third type of projection used on the maps in this book is shown on page 25. The legend indicates that this map of Antarctica is a *Stereographic Projection*. Such maps have two important qualities. First, the center of the map corresponds to a single point on the globe—in this case, the South Pole. Cartographers say that projections developed from such a single point on the globe are *azimuthal*. All points on such a map are in their true direction from the selected point. Second, the stereographic projection is *conformal*. Every small area within the meridians and parallels has its proper shape. The scale changes from the center toward the edge of the map. Features are enlarged, therefore, near the edge.

As you look at the maps in this book, and at other maps in encyclopedias and atlases, notice in the legends what projections are being used. When you find new kinds of maps, look them up in encyclopedias under "Maps and Map Making" or in atlases. Cartographers choose different kinds of maps for different purposes. The

projections used in this book are believed to be the best ones to show the areas of the Earth in the Western Hemisphere.

**Map Making of Outer Space.** Making accurate maps of the planet on which we live is difficult, as we have learned. Map making of areas beyond our Earth presents even more difficult problems. We know that our Earth is a rotating sphere which revolves around the sun once each  $365\frac{1}{4}$  days. The Earth and other planets which revolve around our sun make up our solar system, which is part of the Milky Way galaxy. A galaxy is a very large collection of stars which moves through space. The Milky Way galaxy is very, very large, containing probably 100 billion stars like our sun. Our solar system moves within the galaxy at the speed of 175 miles per second. We believe that it takes our solar system more than 200 million years to complete one revolution within the galaxy.

One difficulty in mapping outer space is the speed at which the Earth, the solar system, and the galaxy are moving. Another difficulty is the tremendous distances



View of a portion of the Milky Way. Scientists believe that this galaxy extends nearly 800 million billion miles in space.

between stars of the galaxy. These distances are so great that they are measured in **light years**. A light year is the distance light will travel in one year of time. You might like to figure out how many miles that distance is. Light travels at the rate of about 186,000 miles per second. How many miles would light travel in one year? The closest star to our sun is 4.3 light years away. About how far away is it in miles?

Occasionally, small bits of matter from outer space strike our atmosphere. We usually call them shooting stars, but astronomers call them **meteors**. You can see some meteors on almost any clear night. Most of them burn up in the atmosphere, but occasionally a meteor does not burn up and it strikes the surface of the Earth. Then, it is known as a **meteorite**. A few large meteorites have struck the Earth. A very large one struck years ago in northern Canada, making a crater two miles wide.

Some of you now studying the geography of the Western Hemisphere may

Oregon's 150 ton Willamette Meteorite is the largest yet found in the United States.

take a rocket trip to the moon or to one of the planets in our solar system. Plotting a course so that your rapidly moving rocket ship will arrive at its destination will not be easy. You will be leaving one rapidly rotating, revolving, and space-traveling planet for another one which also moves rapidly. The authors hope you will have a good space geographer and a good navigator aboard when you go!

## QUESTION BOX

### 1

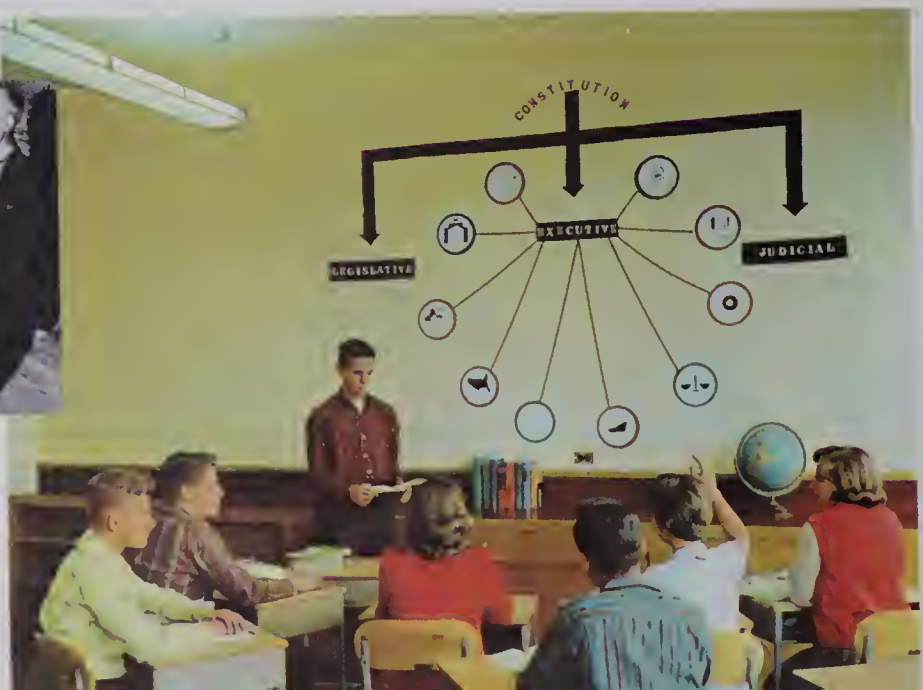
1. What is the Western Hemisphere?
2. How can the Earth be divided into hemispheres?
3. What is the shape of the Earth?
4. About how many statute miles are in one degree of latitude?
5. What important line was set by an agreement among 25 nations in 1884?
6. What is a map projection?
7. What are the two basic types of maps used by cartographers? What is the difference between them?
8. What is an azimuthal projection?
9. How many stars like our sun probably are part of the Milky Way galaxy?
10. About how long does it take our solar system to complete one revolution within the Milky Way galaxy?
11. What is a light year?
12. What is a meteor? What is a meteorite?







These pictures show some of the contrasts found in the Western Hemisphere. What do the photographs tell you about living in North and South America?





### **Importance of the Western Hemisphere.**

The Western Hemisphere is of great importance for several reasons. Among them are the following:

- Most of the countries in the Western Hemisphere are free, independent, and comparatively young.
- Population is growing very rapidly in the Western Hemisphere, partly because of immigration from other lands.
- The continents have tremendous natural resources, including fertile soil, minerals, large rivers, the world's largest plain, and vast forests.
- The Western Hemisphere has great productive capacity, containing the nation which leads the world in production, the United States, and several other major agricultural and manufacturing countries.
- Countries of the Western Hemisphere are linked by a complex and fairly complete transportation network which also extends across both oceans to nations in the Eastern Hemisphere.
- Several of the world's greatest cities, including some of the most modern and fastest-growing cities, are located in the Western Hemisphere.
- For a considerable period of time, the nations of the Western Hemisphere have provided the balance of power in the struggle called the "cold war." This struggle is between nations controlled by the Communist Party and nations in which men are free to think and act.
- The Western Hemisphere is especially important to us because that is where we live.

**Rapid Change.** Many areas of the world are undergoing very rapid change. Nowhere on the Earth has more rapid progress been made in the past 100 years than on the two continents of the Western Hemisphere. Much of this progress has

been made in the last 50 years. You have seen some progress wherever you live. The people of the Western Hemisphere are constantly building better roads, better airports, and dams and levees to control rivers. They are constantly searching for new mineral deposits below the surface of the Earth, planting trees on land which has been misused, and adding minerals to the soil so that the land will remain fertile. New and better homes and office buildings are being constructed. New and better manufacturing plants are being built. Nowhere else in the world has such a high standard of living been achieved for the average man.

In parts of the Western Hemisphere, however, old ways of doing things are still common. In some areas, few boys and girls are being educated, the soil is being misused, and forests are being wasted. In some countries, change is slow and the standard of living for the average man is low. These areas are of particular concern to free peoples everywhere.

**Peoples of the Western Hemisphere.** At one time, very few people lived on the two continents of the Western Hemisphere. When Europeans began voyages of discovery in the 15th and 16th centuries, they found the two continents of the Western Hemisphere to be practically uninhabited. Since then, millions of people have migrated to these continents. Many of them came from Europe. They brought their ways of living, including their languages, to the Western Hemisphere. Many of the Africans who came were brought in chains as slaves. People from Asia, too, have brought with them ways of living which were common in their lands.

All of these peoples have created, within the last four hundred years, new nations with unique ways of living. Although there are many differences from place to place, the people and customs of Mexico, Central



America, and South America are quite similar. This region of the Western Hemisphere is commonly called *Latin America*. This name is used because the languages spoken and the ways of living are closely related to those of Spain and Portugal. Both the Spanish and Portuguese languages are derived from Latin.

The northern portion of North America includes the United States and Canada. The customs followed in northern North America have been greatly influenced by the English language and English customs. Today, however, people have come from all over the world to live in these countries. Ways of living in the United States and Canada generally are much alike.

**Organization of American States.** In 1948, twenty republics of Latin America and the United States formed the Organization of American States. This association developed from another organization called the Pan American Union. The Union was formed in 1890 to increase trade and friendship among the peoples of the Western Hemisphere. The Organization of American States, called the OAS, was established to help solve common problems in defense and to prevent wars among member countries. Since its founding, the OAS has helped prevent several wars.

In recent years the OAS has begun to give more attention to the economic development of the Western Hemisphere. Such action has been taken partly because of the wide differences in living standards between the United States and Latin America. Also, competition for world markets has caused some concern among the nations.

The need to improve living standards in Latin America is particularly important just now because Communists are attempting to seize power in a number of countries. The Communists promise land to farmers, high wages to factory workers,

good schools for all children, and jobs for everyone. To a person who has been poor all his life and sees little possibility of change, such promises sound good. The Communists do not tell the whole story, however. Based on happenings at other places, people in countries that adopt communism are likely to have little freedom. One can also predict that any person who opposes a government run by Communists will be placed in jail, sent to a labor camp, or killed. Living standards in such countries are not likely to rise for a long, long time, either, because almost all money is spent by the state on heavy industry.

Unfortunately, through the years, many people in Latin American countries have never had much freedom. Dictatorships have been common, and several still exist. When people have never known freedom but have known poverty, they sometimes are willing to forego freedom for promised ways of overcoming poverty. Organizations such as the OAS can do much to help Latin American nations. However, much that needs to be done can be accomplished only by the people themselves.

## QUESTION BOX

### 2

1. Why is the Western Hemisphere of great importance? (Give several reasons.)
2. In what ways is progress being made in many areas of the Western Hemisphere?
3. What areas of the Western Hemisphere are of concern to free peoples?
4. What are the two main regions of the Western Hemisphere?
5. What is the Organization of American States? What has it accomplished?
6. Why can it be said that freedom and communism do not "mix"?

## GLOBE AND MAP ACTIVITIES

1. Answer the following questions on a sheet of paper. Try to complete them without looking in the book, but when you have finished, check your answers to be sure that you have answered correctly. (a) On most conformal projections, which of the grid lines are straight lines? (b) On most equal-area projections, which of the grid lines are straight lines? (c) On which kind of projection, conformal or equal-area, do all the grid lines meet at right angles? (d) How is the latitude of a place determined? (e) At what latitudes are the parallels one-half as long as the equator?

2. Find types of projections, other than "Conformal Conic" and "Parabolic Equal-Area," which are used in atlases and encyclopedias. Make a series of large charts for the classroom, illustrating the projections used in this book and in atlases and encyclopedias. Use the opaque projector to enlarge the maps from these reference books.

3. Use the map of the United States on pages 218-219 and locate as accurately as possible the following cities by latitude and longitude: New York, N.Y.; Los Angeles, Calif.; Helena, Mont.; St. Paul, Minn.; Augusta, Me.;

Springfield, Ill.; Denver, Colo.; Phoenix, Ariz.; New Orleans, La.; and Key West, Fla. One committee may use a large wall map to locate the cities; another committee may look up the location of the cities as given in an atlas index.

4. Use the maps of North America on page 203 and of South America on page 53 to answer the following questions: (a) What covers the ground during summer months at Barrow, Alaska? (b) What is the land like around Kansas City, and how is most of it used during summer months? (c) What covers the land in the center of Greenland during summer months? (d) What is most of the land like to the west of Phoenix? (e) What would you expect to find on the land in the interior of the Yucatán Peninsula? How does the interior of the peninsula differ from the northern part of it? (f) What is the land like near La Paz, Bolivia? (g) What grows on the land around Manaus, Brazil, in the summer? In the winter? (h) What grows on most of the land around Brasília, Brazil in the summer? (i) What grows on the land in the summer around Punta Arenas, Chile? (j) Would you expect to find vast forests near Lima or Iquitos, Peru?

## OTHER LEARNING ACTIVITIES

1. Attempt to figure, as accurately as possible, the exact location of your classroom in degrees, minutes, and seconds of longitude and latitude. A department of your city government probably has an accurate map which you can use to do so.

2. Develop a report on the problems and prospects of space travel. Include in your report the kinds of problems that must be solved before it is possible for men to travel to the moon or to another planet. Indicate when such trips are likely to be undertaken.

3. Make a special study of planets, stars, and galaxies. Prepare a report for the class which indicates how scientists obtain knowledge about the universe. You may wish to include in your report a section on great events in the history of astronomy.

4. Prepare a report on the Pan-American Highway. In giving your report, project a map showing completed portions of the highway and project also scenes along the highway. Be sure to include information about the completion of the highway, and how this will affect the development of the Americas.

5. Look at the Table of Contents on pages 4-5 to discover areas and aspects of the Western Hemisphere which will be covered in this book. Begin to locate people in your community who have traveled to, or have lived in, areas other than the one in which you live. On a 3 × 5 card record the name of the person, where he has traveled, what particular knowledge he has, and how you think he could be helpful to your class. Collect and organize the cards to be used as references.







# ANTARCTICA

Antarctica is a vast land, surrounding the South Pole and stretching nearly 2,500 miles from shore to shore. Almost the entire area is covered with ice. Much of Antarctica is high above sea level; the South Pole itself is located on an ice plateau 9,200 feet higher than the sea. As Table II in the Appendix shows, Antarctica has approximately five million square miles of territory. Thus, it is more than twice as large as Australia, and three times larger than Europe. Nevertheless, men have always wondered whether Antarctica actually is a continent. They thought it might be only a series of mountainous islands joined together by the tremendous ice sheet. The most recent findings seem to indicate that west Antarctica, between the Ross Sea and the Bellingshausen Sea, probably is a series of mountain ranges. If all the ice melted, the ranges would be separated, one from the other, by miles of water. There is little doubt, however, that east Antarctica is indeed a vast continent. Maps of Antarctica still are not exact, because of the ice sheet. The size and shape of Antarctica may in time be shown on maps and globes quite differently from the way they are shown now.

**Sunlight and Darkness in High Latitudes.** In relation to the path it follows around the sun, the Earth is tilted  $23\frac{1}{2}$  degrees on its axis. It is always tilted at this angle as it revolves around the sun. For this reason, there are well-defined seasons in middle latitudes called summer, autumn, winter, and spring. Do you remember which areas of the Earth are in middle latitudes? High latitudes, which are areas within  $23\frac{1}{2}$  degrees of either pole, have a very different seasonal pattern. The most dramatic differences in high latitudes are related to sunlight and darkness.

The Vernal or Spring Equinox usually occurs on March 21. At this time, day and night are the same length everywhere on the Earth except at the poles. At both the North and the South Poles, the sun can be seen for 24 hours on March 21. For the entire day the sun follows a circular path around the horizon, neither rising above it nor dipping beneath it.

On the following day, at the South Pole, the sun is not seen at all. Much of the day is like twilight because the sun is near the horizon although never above it. The sun is not seen above the horizon again at the South Pole until the time of the Autumnal



Equinox, which usually occurs on September 22. On the day after the Autumnal Equinox, at the South Pole, the sun again follows a circular path around the horizon, but now its path is slightly higher in the sky. The sun will be visible constantly, except when clouds or storms obscure it, until the Vernal Equinox six months later.

The area of constant sunlight, which makes a small circle on the Earth at the South Pole on September 22, continues to grow. On each day following September 22, the path of the sun gets a little higher in the sky and the circle of constant sunlight becomes a little larger. On or about December 22, all of the area south of the Antarctic Circle has 24 hours of constant sunlight. In the Southern Hemisphere, this day is known as the Summer Solstice. On

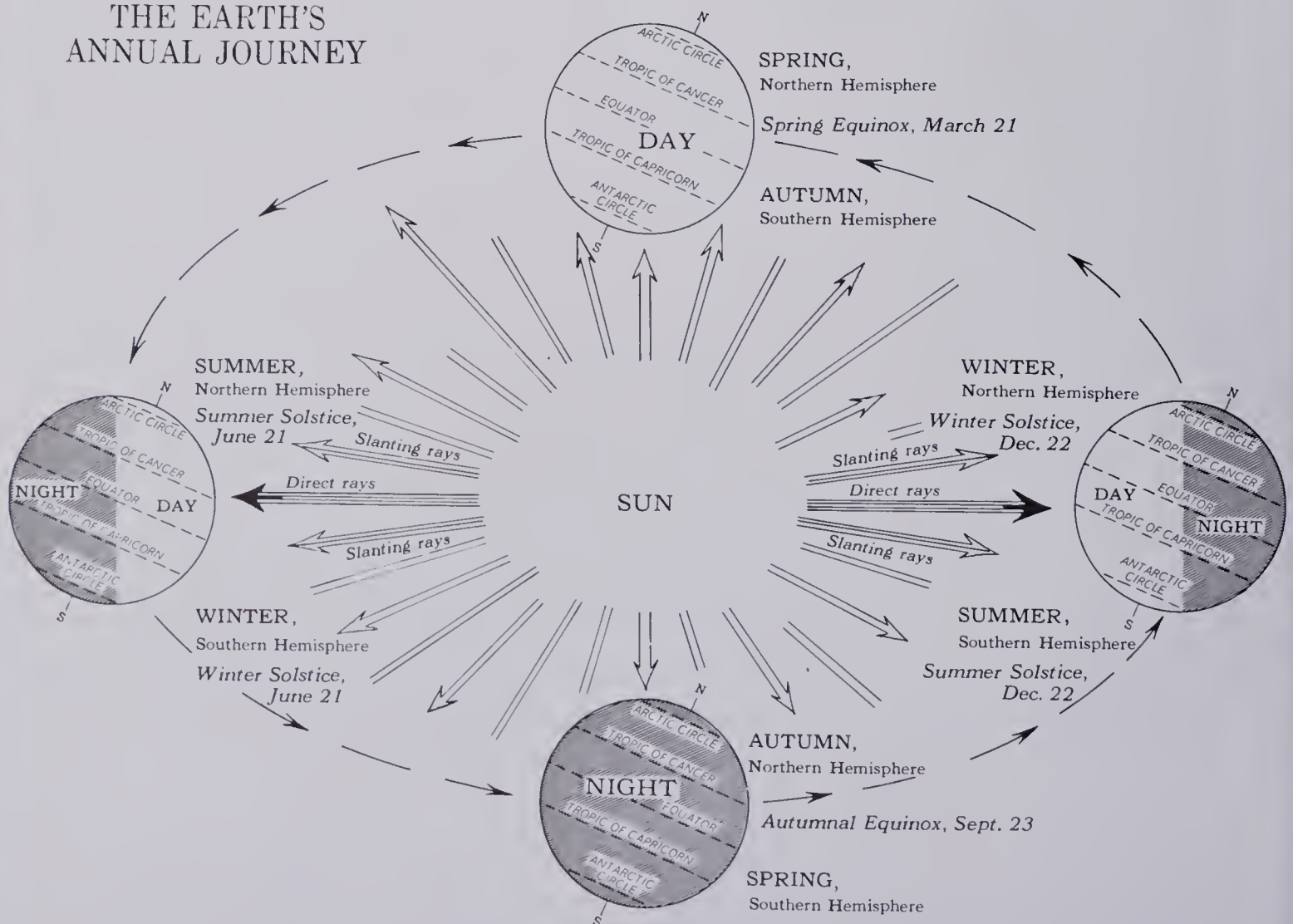
the following day, this process is reversed; the path of the sun becomes lower in the sky, and the area of constant sunlight becomes smaller. This process continues until the Vernal Equinox, when the sun is visible for 24 hours only at the South Pole. What happens on the day following the Vernal Equinox? The area of constant darkness becomes larger, day by day, until June 21, when all of the area within the Antarctic Circle has 24 hours of darkness. This day in the Southern Hemisphere is known as the Winter Solstice.

You remember, of course, that seasons north and south of the equator are reversed. Therefore, the Summer Solstice in the Northern Hemisphere comes in June, and the Winter Solstice in December.

How can a place which receives six

Study this diagram which shows the seasons of the Earth. On what day does all the area within the Antarctic Circle have 24 hours of sunlight? During what day will the sun's rays shine most directly on the Antarctic Circle?

## THE EARTH'S ANNUAL JOURNEY





*Left.* This ship, icebound in the Bay of Whales, served as Amundsen's base in 1911. *Right.* Admiral Byrd broadcasts from Little America II.

months of sunlight be covered with ice to a depth of several thousand feet? No land on Earth receives more sunlight than the South Pole, yet temperatures there average  $60^{\circ}$  below zero. This temperature was recorded steadily in a long deep tunnel which was dug at the South Pole by a group of American scientists and Navy men. On the surface the temperature varied considerably, dropping as low as  $102^{\circ}$  below zero and rising to  $5\frac{1}{2}^{\circ}$  above zero.

There are two good reasons why polar areas remain cold even during summer months. First, the sun's rays always strike polar areas at a slanting angle. Never is the sun high in the sky. The sun's rays, therefore, have to penetrate much of the Earth's atmosphere before reaching the surface of the land. The second major reason for the cold climate is that the white ice reflects sunlight so well that very little heat is absorbed. It is estimated that as much as 95 per cent of the heat from sunlight during the Antarctic summer is reflected by the ice.

The Antarctic is colder than the Arctic because it is higher above sea level. The high plateau surrounding the South Pole is between nine and ten thousand feet in altitude. By contrast, the North Pole is at sea level in the Arctic Ocean. Although it may be in beautiful sunlight, the South Pole is one of the coldest spots on Earth.

**Famous Explorers of Antarctica.** Ever since the days of Columbus and other early explorers, sailors have ventured into the oceans surrounding the Antarctic continent. Often they have been caught in violent storms, with howling winds and high waves. Sometimes they have spotted many icebergs in the sea, and have been forced to turn away from the continent because of huge fields of floating ice.

As with other explorers, the desire to know more has continued to drive men to Antarctica. Many of them have journeyed there in attempts to reach the South Pole. One of the greatest explorers never reached the South Pole, although he came within about 100 miles of it. Sir Ernest Shackleton and his party reached  $88^{\circ} 23'$  South at  $162^{\circ}$  East on January 9, 1909. He used Manchurian ponies to pull his sleds of supplies. A food shortage and terrible storms forced the men to return to their base at the Bay of Whales. Later, in 1914, Shackleton and a number of men were trapped in the Weddell Sea when their ship was crushed by ice. He and the crew members transferred stores and equipment to a cake of ice, and drifted out towards sea. They eventually reached Elephant Island in the South Shetland Islands north of the Palmer Peninsula. Leaving most of his men there, Shackleton and a crew of five other men sailed in a small boat 800 miles to South



# LEGEND

NEW YORK CITY	more than 2,000,000
Detroit	500,000 to 2,000,000
Sacramento	fewer than 500,000
National capitals	⊙
State or province capitals	⊗
All other cities	•
Exploration route	→ → → → →
Point of interest	x
Undefined boundary	-----

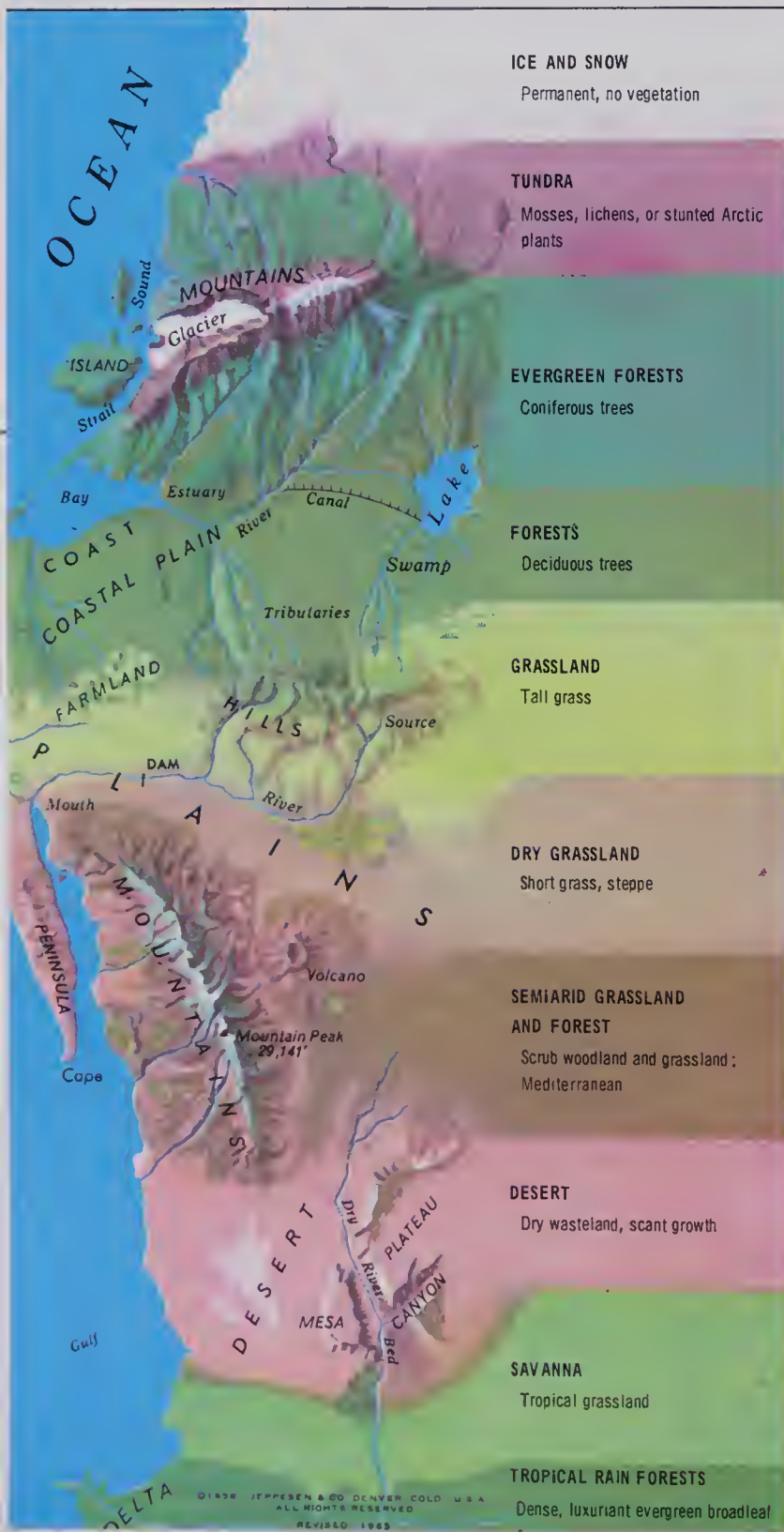
The map legend at left shows, by color or by shape, representative land, vegetation, and water features that will appear on major maps in this book. Most continents have a variety of land features and types of vegetation. Notice how few features there are, however, on the map of Antarctica at the right.

Georgia Island for help. The men finally were rescued. Find South Georgia Island on a large wall map of South America or on the globe. It is located at about 54° South and 37° West.

In 1911, the first group of men reached the point farthest south on the Earth. Roald Amundsen of Norway and four companions traveled inland from the spot now shown on the map as Little America. The men used Eskimo dogs to pull four sleds of supplies. Amundsen reached the pole on December 14, and planted the Norwegian flag there. He and his companions returned safely to their base at the Bay of Whales, and later returned to Norway.

At the same time that the Norwegians were traveling toward the South Pole, a group of British explorers under the leadership of Robert F. Scott were also attempting to reach it. They headed inland from near the spot marked on the map as the McMurdo Station at about 163° E. As Shackleton had done, Scott used ponies to pull his sleds of supplies. However, the ponies were not very useful in the ice fields, and the men eventually had to pull the sleds themselves. Scott and his companions reached the South Pole on January 18, 1912, but found that the Amundsen party had reached the Pole earlier.

On the return trip to the coast, Scott and his companions became weaker and weaker from dragging the sleds. They died of exhaustion and cold only 11 miles from one of their supply camps, and only a little more than 100 miles from the coast. Scott kept very careful records during his





## ANTARCTICA

0 600 1200  
Scale 1200 miles to one inch  
Polar Stereographic Projection

ICE AND SNOW

MOUNTAINS



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REVISED 1965

journey. The records, including entries made on the last day of his life, were found by the search party which discovered Scott's final camp.

In 1929, one of the most famous Antarctic explorers of all time, Admiral Richard E. Byrd, established the first United States base in Antarctica. He built it on the Ross Ice Shelf near the Bay of Whales and named it Little America. The Ross Ice Shelf is a tremendous sea of ice from 600 to 1,000 feet thick, which moves northward about five feet each day. Great chunks of ice break off the shelf each year and float out to the sea as icebergs. Since 1929, five different Little Americas have been established, the latest one in 1956. Admiral Byrd made many expeditions into the Antarctic continent, and spent one winter by himself in a small shack at a point 80° 8' South, 163° 57' West. Locate this point on the map. Although Admiral

Byrd made five different trips to the Antarctic, and was the first man to fly over the South Pole, he never set foot on the ice at the Pole. During his expeditions, however, much new equipment was tested. He proved that airplanes could be used quite successfully for explorations on this coldest continent.

Traveling through this broken ice is easy work for these icebreakers. If necessary, they can break a path through solid ice.



## QUESTION BOX

3

1. Why may the shape of the Antarctic continent be different from that shown on maps at the present?
2. Which part of Antarctica probably is a series of mountain ranges covered by a thick ice sheet? Which part of Antarctica is a vast continent?
3. About how high above sea level is the ice plateau at the South Pole?
4. What is meant by the terms *Vernal Equinox* and *Autumnal Equinox*?
5. What is meant by the terms *Summer Solstice* and *Winter Solstice*?
6. Why are polar areas cold even though they have six months of sunlight?
7. Who were the first two explorers to reach the South Pole? How long ago did they make their overland journeys? Which explorer died on the return trip to the coast?
8. Who was in charge of building the first United States base in Antarctica? What did he contribute to polar exploration?
9. What is the Ross Ice Shelf (where Little America was located)?

**The Amundsen-Scott Station at the South Pole.** The first person after Scott to arrive at the South Pole was Admiral George Dufek of the United States Navy. He landed there in a ski-equipped airplane on October 31, 1956. Admiral Dufek was in charge of a number of exploratory operations in Antarctica that year. A complete camp for a group of explorers and scientists was built at the South Pole. Almost all the equipment and provisions used at this camp at the South Pole was dropped by parachutes.

At the present time, flying over Antarctica is dangerous. Naval and Air Force


planes have been flying great distances across the continent for several summers. The men do it rather routinely now, but every trip is hazardous. The weather is very changeable. On a beautiful sunny day, a howling blizzard can occur with little or no warning. Blowing snow which causes white-outs, so that the Earth melts into nothingness even for persons on the ground, may also occur without warning. There are no emergency landing fields, and only a few places where airplanes can be serviced and refueled. The water around the Antarctic continent, moreover, is so cold that a man can live in it only a few moments if a plane is forced down at sea. Survival equipment is carried on every flight. On overland flights, the men, if uninjured, would have food and sleds on which to carry it. On oversea flights, inflatable boats and rubber clothing are carried.

In 1957, Dr. Paul Siple and seventeen other scientists were flown to the South Pole to spend the winter there. Their outpost was named the Amundsen-Scott Station. The United States has maintained a scientific base at the South Pole ever since.

Flying all the food and equipment to the South Pole to keep that base supplied was and is very expensive. Admiral Dufek has estimated that it costs about one million dollars per man per year to keep the Amundsen-Scott Station operating! Scientific findings make such expense worthwhile.

One of the greatest expenses in early Antarctic exploration was the cost of fuel. While the bases were being constructed, about 42 per cent of all the space on the supply ships was taken up with fuel. Almost 70 per cent of the space at the bases was used to store fuel. Now, however, major bases are kept warm and electricity to provide light and power for motors is obtained from nuclear fuels.





Two snow cats make their ways across the broad expanses of land in Antarctica. This equipment belongs to the U.S. Antarctic Research Program. Antarctica affords opportunities for research to many kinds of scientists.

**Around the World in Ten Minutes.** Jet airplanes are flying faster all the time, and rocket ships, when perfected, will be faster yet. Nevertheless, there are only two places where you can go around the world in ten minutes. At the South Pole, Navy men have set fuel drums in a large circle surrounding the Pole. The drums are placed so that they roughly correspond to the meridians of longitude shown on a globe. By walking around the drums, a person may, within a very few moments, go through every time zone, cross the International Date Line, and complete his circle of the Earth within ten minutes! At what other place on the Earth could this be done?

**The Problem of Water on Antarctica.** On a few summer days, near the Antarctic coast, the temperature rises high enough to cause some melting of snow and ice. Throughout most of the continent all year long, however, water is never available except in the form of ice. At every base and on every expedition, snow or ice has to be melted to obtain water. At the Amundsen-Scott Station at the South Pole, the scientists decided to dig a long tunnel down into the ice. Not only did they carry the ice out of the tunnel for water, but they were able to learn a great deal from their under-surface exploration.

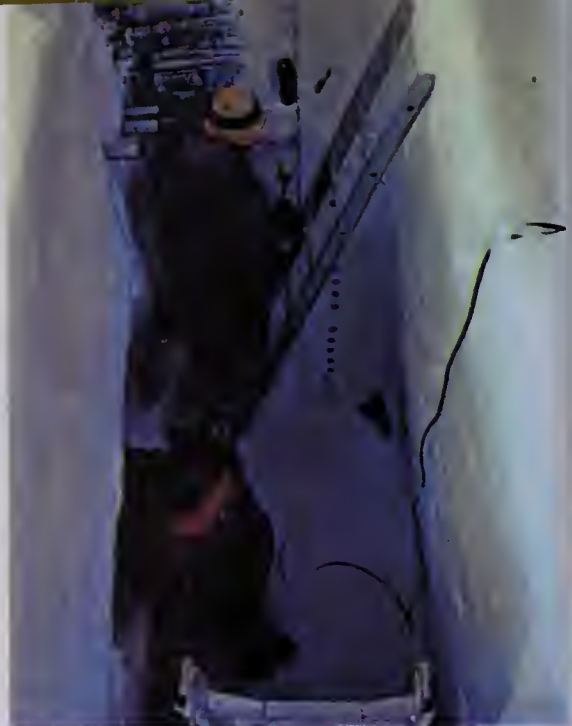
**Fire Amid the Ice.** Only one spot on the whole Antarctic continent appears to be truly warm, and that is the crater of Mt. Erebus. Mt. Erebus is an active volcano 15,000 feet high, which is located on Ross Island near McMurdo Sound. It is the only volcano discovered to date on the continent of Antarctica. Occasionally, eruptions throw rocks and ashes into the air. Most of the time, the mountain belches steam into the cold atmosphere. Mt. Erebus is a good landmark for pilots flying to the airport at the Naval Air Facility, McMurdo.

**New Equipment Designed for Use in Antarctica.** To make travel across the icecap of Antarctica safer and more rapid, a number of very interesting new gadgets have been invented. One is an electric crevasse detector. The Antarctic icecap is full of treacherous, deep crevasses which cannot be seen by the naked eye. The crevasses are covered with a rather thin layer of snow and crusted ice. The weight of a snow cat or a tractor is so great, however, that the crust will break under it. The crevasse detector is attached by long poles to the leading snow cat in a party. When the detector passes over an area which is not solid ice, a needle on the dashboard of the snow cat or tractor swings wildly. By stopping quickly, the leading cat is saved from tipping dangerously

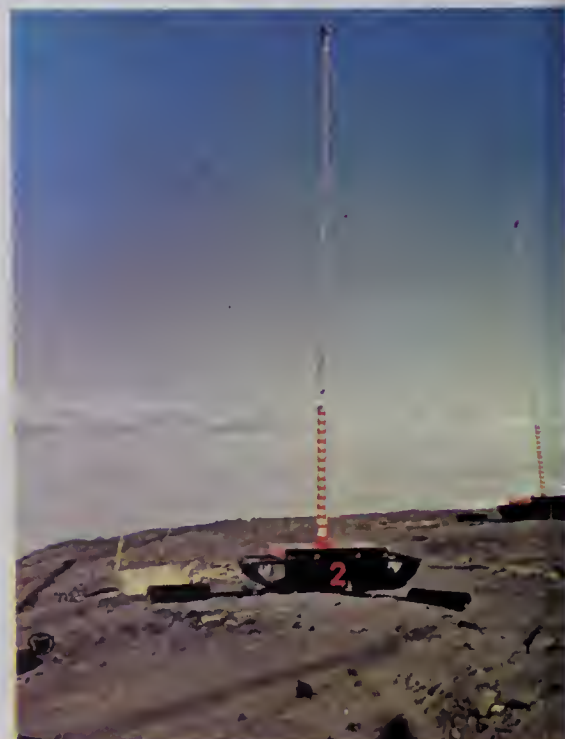
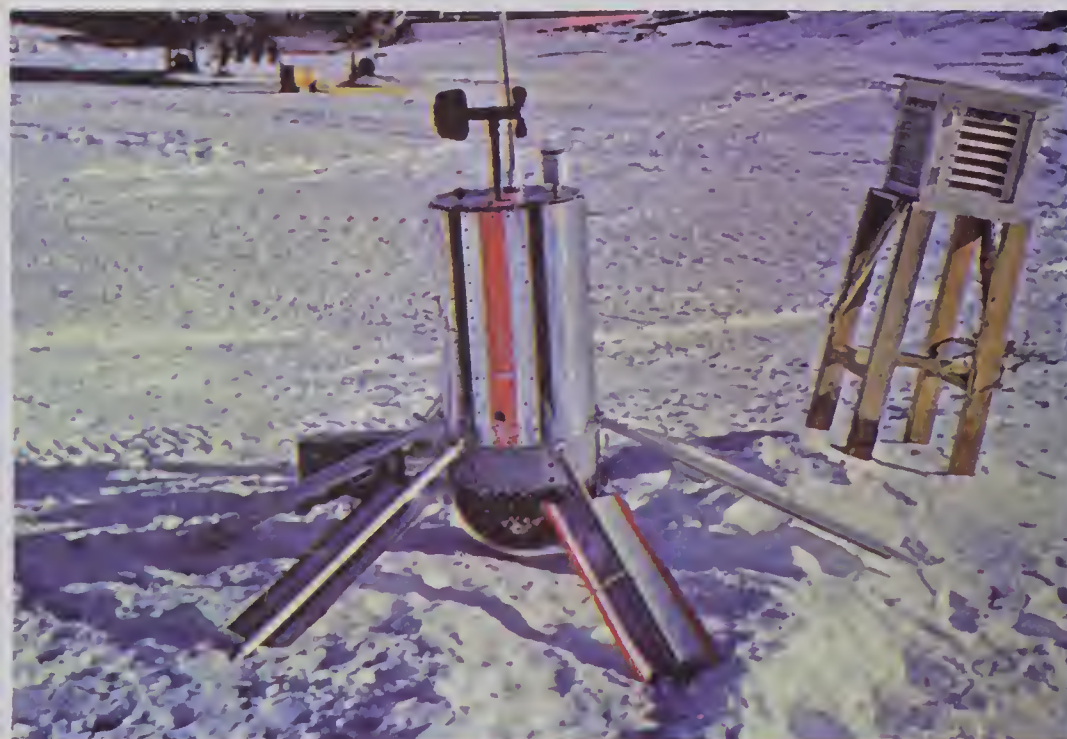




*Left.* Penguins native to parts of Antarctica show little fear of man. In the background is Mount Erebus, from which a tiny wisp of steam appears. *Right.* Deep pits were dug into the ice in order that scientists could gather information about the age, weight, and density of the different layers of ice. The ice which had been loosened was then melted to obtain water.



*Upper left.* Sometimes, on clear days, dangerous crevasses can be spotted from the air. The darker, bluer streaks show where crevasses may be found. *Upper right.* The four discs that extend in front of the cat are crevasse detectors. *Lower left.* View of an automatic weather station, a grasshopper. *Lower right.* This "pinball machine" also transmits weather data.





on the edge of a great crevasse or from falling into it.

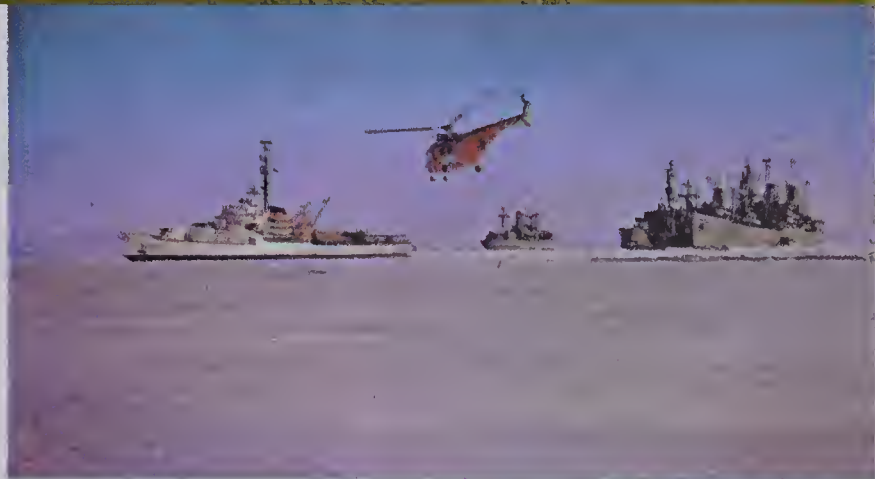
Another very interesting new gadget is a weather broadcasting station called a grasshopper. It is parachuted from an airplane. When it lands, some legs are automatically released so that it stands up on the ice. Then it begins to broadcast information about wind direction and speed, temperature, and air pressure. Stations as far away as 800 miles can receive the weather information from the grasshoppers. Thus, scientists can collect much weather information without discomfort.

### QUESTION BOX

4

1. Who was the first man after Scott to reach the South Pole? What scientist spent the first winter at the South Pole with seventeen other men?
2. Why is flying in Antarctica dangerous?
3. Why is it a problem to obtain water on Antarctica?
4. Where on the Earth can a person walk through all time zones and cross the International Date Line in only a few moments?
5. Where on Antarctica is a spot that is always warm?
6. What new equipment has been invented for use in Antarctica?

**The First Transcontinental Crossing.** Sir Vivian Fuchs, one of the greatest present-day explorers of the Antarctic, made history in 1957-58 when he journeyed by land across the continent. This first transcontinental journey was made from Shackleton Station on the Weddell Sea to the South Pole Station. Fuchs and his party of twelve men then continued to Scott Station at McMurdo Sound. This first crossing of Antarctica, in spite of severe



Thousands of tons of equipment and supplies are needed to maintain expeditions and stations in Antarctica. *Top.* These ships are just off the Ross Ice Shelf. *Center.* This plane has flown in with supplies from New Zealand. *Above.* A snow cat pulls the sleds of this exploring party. *Below.* This cat was used in Fuchs's transcontinental crossing.







The man on the left is preparing to insert a dynamite charge into the ice. The shock waves produced by the explosion are measured by scientists to determine the depth of the ice. The man on the right is using an instrument that measures the strength of the magnetic field.

hardships, was a tremendous scientific achievement. Working inland from the Weddell Sea to the station known as South Ice took the Fuchs party four weeks. In that time the men had traveled only 270 miles because of rough ice and many crevasses. By the time they reached the South Pole, in 56 days, four of the nine vehicles they started with had been abandoned. The party was about four weeks behind schedule. There were doubts as to whether or not the expedition would be able to complete the trip across the continent before the Antarctic winter set in.

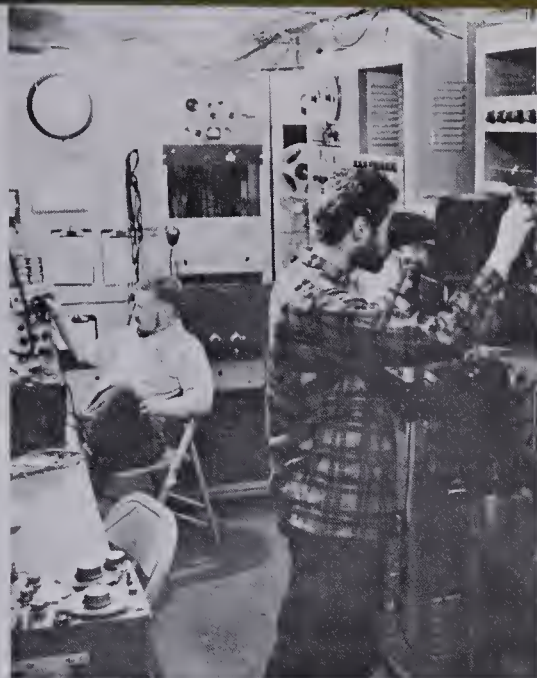
While Fuchs and his party were moving toward the Pole, Sir Edmund Hillary of New Zealand was leading a support party inland from Scott Station near McMurdo Sound. Hillary's purpose was to establish supply dumps for Fuchs and to find a good trail through the rough ice. Although Hillary at first had not planned to go to the South Pole, he made such good time that he continued on to the Pole, reaching it on January 4, 1958. Fuchs did not reach it until January 20. After a few days' rest at Amundsen-Scott Station, Fuchs and his party set out for Scott Station. Thirty-eight days later, on March 2, 1958, they

completed the journey of 2,220 miles. Every thirty miles between the Weddell Sea and the South Pole, scientists with the Fuchs party took soundings to determine the thickness of the ice. They took such soundings about every forty or fifty miles thereafter. The trip across the continent was a tremendous scientific success and a great triumph of man over the forces of nature.

**The International Geophysical Year.** Between June 30, 1957, and December 31, 1958, scientists of 64 nations joined together to try to learn more about the Earth on which we live. This joint effort was known as the International Geophysical Year (IGY). More than 400 million dollars was spent for research during this period of 18 months. Fifty-eight scientific stations were established by the United States and 11 other nations in Antarctica. Much of the IGY research was centered in Antarctica because scientists felt that better knowledge about Antarctica would be helpful in understanding the weather and climate of our Earth.

The United States which, during the IGY, had seven stations in Antarctica, now has only three stations that are still operating.





*Left.* Scientists record upper-atmosphere radio noise in a building constructed under the ice at Byrd Station. *Center.* This scientist is recording data from instruments which measure sunspot activity. *Right.* Not all the area near McMurdo Sound is snow-covered.

They are Amundsen-Scott Station at the South Pole, Byrd Station at 80° South 120° West, and McMurdo Sound. Find all of them on the map of Antarctica on page 25. The U.S.S.R. maintained four scientific bases on Antarctica during the IGY and have kept scientists at them most of the time since. The other nations which maintained stations during the IGY were Argentina, Australia, Belgium, Chile, France, Japan, New Zealand, Norway, South Africa, and the United Kingdom.

A number of very important studies were made simultaneously by the scientists of the 64 nations during the IGY. The influence of Antarctic weather on the rest of the world's weather was studied. Scientists also made tests to determine the effects of cold weather on human beings and on machines. Studies were made using dynamite to determine the thickness of the icecap.

Scientists also attempted to determine the relation between **sunspot** activity and happenings on the Earth. Sunspots are storms, made up of whirling masses of electrified gases, which occur in the sun's atmosphere. They occur at particular periods of time, during which they affect magnets, electrical instruments, and radio transmis-

sion and reception on Earth. Scientists in Antarctica also studied the **aurora australis**, while scientists in the Arctic at the same time were making studies of the **aurora borealis**. Do you know what these terms mean? Aurora borealis is the scientific name for the Northern Lights, and aurora australis is the scientific name for the Southern Lights. The auroras are caused by electrically charged particles, believed to be shot from sunspots, which glow as they enter the Earth's atmosphere. The displays of light in the sky are most clearly visible near the Earth's poles and at times of greatest sunspot activity.

During the IGY, other studies were made of **cosmic rays**, polar radiation, and the upper atmosphere. Cosmic rays are electrically charged particles of high energy that also originate in outer space. Scientists believe that sunspot activity influences cosmic rays, but do not yet know how. The intensity of radiation from these rays is greatest near the Earth's poles, and weakest near the equator. The intensity also is much greater in outer space than within the Earth's atmosphere. The findings, therefore, should be of great value in space studies and explorations.





*Upper left.* This is an aerial view of McMurdo Station on Antarctica. It is the largest of all the Antarctic stations. *Upper right.* This picture was taken during the month of September. Will the sun be above the horizon for the next five months? *Lower left.* The winds and snow of Antarctica have forced this convoy to halt. *Lower right.* The heat to melt ice and snow in this ice melter is provided by a generator which is nearby.



Living space is limited in the vehicles which carry men and equipment on overland expeditions. Meals are prepared in small, well-arranged galleys. The men's bunks are built-in to conserve space.



*Left.* Can you tell from this picture what Antarctic season has just begun? *Below.* Many nations took part in the IGY. On the left is a Russian scientist, on the right is a man who is from the state of Alaska.





**Important Findings about Antarctica from the IGY.** One of the major findings of the IGY has already been discussed. Antarctica is a continent. West Antarctica, however, probably is a series of islands connected by a vast ice sheet. Other findings include the following:

- There is more ice on Antarctica than was originally believed to be there. The icecap contains about 84 per cent of all the ice on the Earth. If this ice were spread across the United States, it would be at least two miles deep. If it melted, the oceans would rise almost 200 feet.
- During the long polar night, winds race around the South Pole at tremendous rates of speed. These winds, reaching 150 miles per hour or more at 50,000 feet, blow generally from west to east. They may be used some day by jet aircraft to increase their flight speed from Australia to South America. During the polar summer, these winds are not nearly as strong.
- Probably, there was considerably more ice in Antarctica a thousand years ago than there is today. However, scientists are not sure whether the continent actually is warming up. There seems to be little evidence of any major change in recent times. For instance, there has been little or no change in a dry valley discovered and photographed by Scott in 1903. It is one of the few places in Antarctica which is not completely ice covered. The patches of snow and ice which were shown in Scott's photograph are still there today.
- Bacteria, which are almost non-existent on the Antarctic continent today, are found buried deep in the polar ice. Because there are few bacteria there today, sickness among men is rare. Cuts heal slowly, however, because helpful bacteria are also absent.
- The aurora australis and the aurora borealis both put on their magnificent displays at the same time. These occur as a result of radiation from the sun.
- More ice-free land exists in Antarctica than was originally thought to be there. A fresh-water lake with some plant life in it was discovered by scientists at the Ellsworth Station.
- The lowest temperature recorded at the South Pole was  $102.4^{\circ}$  below zero. Even colder temperatures were recorded by the Russians at their Vostok base near the south geomagnetic pole. They recorded a temperature of  $127^{\circ}$  below zero!
- The presence of coal beds, leaf fossils, and petrified trees proves that Antarctica was once a warmer place than it now is. It may be a rich storehouse of minerals, including uranium and petroleum, but this has not been proved.

**The Antarctica Treaty.** On December 1, 1959, the United States and eleven other nations signed a treaty regarding the future of Antarctica. These nations agreed that Antarctica shall be used for peaceful purposes only. They further agreed that scientific cooperation such as that achieved during the International Geophysical Year should be maintained in Antarctica. The treaty prohibits military operations and nuclear explosions. All of the nations agreed that the treaty should be maintained indefinitely. After 30 years, however, any one of the nations may request a conference to review and amend the treaty. All of the nations which participated in the IGY scientific endeavor in Antarctica signed the treaty.

An international scientific union has since been formed by the countries which signed the treaty. It is called the Special Committee for Antarctic Research (SCAR), and its aim is to continue the



research begun during the IGY. The union is believed to be a real step forward.

**The Future of Antarctica.** Since the IGY, explorations of the continent have continued. A new base was built by the U.S.A. at Byrd Station in 1962. The U.S.S.R. has built two new bases: Molodezhnaya on the coast at about 45° E., and Komsomolskaya between Vostok and Mirny. Many additional traverses have been undertaken. Americans have moved from the Ross Sea to the South Pole by almost the same route taken by Hillary and also by a route through the Byrd Station. Russians have reached the South Pole from Vostok. As this book is written, American explorers are attempting to cross from the South Pole to the coast at about 25° E. where Belgium had a station during the IGY. Soviet explorers are trying to traverse the area from Vostok to Molodezhnaya. The first Swiss Antarctic expedition also is in Antarctica. That group hopes to traverse the continent from near the South Magnetic Pole to Komsomolskaya and on to Mawson, an Australian station on the coast at about 63° E. Before long, most areas of Antarctica will have been seen at least once by someone.

No one knows, of course, what Antarctica's future will be. Probably the continent will be at least partly inhabited. An airport probably will be built on ice-free land somewhere near the present station at McMurdo Sound. If and when this airfield is built, passenger flights from Australia to South America and South Africa, by way of Antarctica, will undoubtedly be started.

The weather stations scattered widely throughout the continent of Antarctica will undoubtedly also be kept open. **Meteorologists** believe that much of the weather south of the equator is influenced by what happens in the air above Antarctica. Meteorologists are scientists who study the atmosphere. Some believe that even the weather in the Northern Hemi-

sphere is affected by storms which sweep the Antarctic continent. It is likely, therefore, that continuing studies will be made of the weather and climate of Antarctica.

Another development may occur within the next quarter century. A fairly good ice road to the Amundsen-Scott Station from McMurdo may be constructed. Bulldozers could be used to smooth a path through some of the roughest ice. Temporary bridges could be built in crevasse areas. Supplies could then be taken to the station at the South Pole more cheaply than when they are transported by airplanes.

## QUESTION BOX

### 5

1. Who was the first man after Scott to reach the South Pole overland? Who was the first man to cross the continent on land?
2. What was the IGY? How many nations participated? How many carried on research in Antarctica?
3. Why does it cost so much to keep men at the Amundsen-Scott Station at the South Pole?
4. What kinds of studies were undertaken in Antarctica during the IGY?
5. Is the Antarctic continent warming up?
6. What would happen to the oceans of the world if the ice on the Antarctic continent melted?
7. Why do men in Antarctica seldom have colds?
8. In what way are the aurora australis and aurora borealis similar?
9. How do scientists know that Antarctica was once a much warmer place than it now is?
10. What are the main provisions of the Antarctica Treaty which was signed in 1959?
11. What is the future of this ice-locked continent likely to be?

## GLOBE AND MAP ACTIVITIES

1. What kind of projection is the map of Antarctica on page 25?

2. Which of the following is not quite accurate on such a projection: direction from the pole; distance from the pole; size of land area near the edge of the map; shape of land areas?

3. How far is it from Little America to the South Pole? Is any other coastal area on the continent nearer to the South Pole?

4. Why do you think Sir Vivian Fuchs decided on the route he took across the Antarctic continent?

5. What is the greatest distance across the continent on a direct route which crosses the South Pole?

6. What direction is it: (a) From the

Amundsen-Scott Station to Little America? (b) From the Amundsen-Scott Station to Shackleton Station? (c) From the Amundsen-Scott Station to Mirny? (d) From Little America to the South Magnetic Pole? (e) From Little America to Shackleton Station?

7. What is the altitude of the highest mountain shown on the map? In what range is this peak?

8. How many oceans touch the coasts of Antarctica? Name them.

9. How many seas near Antarctica have been named? List them.

10. What is the name of the peninsula which reaches like a long thumb toward South America?

## OTHER LEARNING ACTIVITIES

1. Join a group responsible for presenting biographical information about famous Antarctic explorers. You may wish to show pictures of the men and the kinds of equipment they used as you give your reports to the class. Among the explorers whom you may want to include are: Amundsen, Byrd, Cook, Ellsworth, Fuchs, Palmer, Ross, Scott, Shackleton, Siple, Wilkins.

2. Join a group responsible for presenting information about types of equipment used by recent explorers in the Antarctic. Secure and present pictures showing the equipment as you explain its use. Articles in *The National Geographic* and *Popular Mechanics* will be especially useful. Remember to include transportation and scientific equipment, and housing materials.

3. Join a group responsible for presenting more detailed information about the Antarctica Treaty. In your report, include not only the nations which signed the treaty, but also explain in considerable detail the basic agreements.

4. Join a group responsible for presenting information about animal and plant life found on and near Antarctica.

5. Join a group responsible for presenting

information about magnetic and climatic data obtained during and after the IGY. Also include information about geologic and seismic findings.

6. Write an imaginative story based upon some major change in the climate of Antarctica or the area where you live. You might, for instance, imagine that all the ice on Antarctica melted quite suddenly, or that one winter the weather where you live became cold and never became warm. Think of the adjustments and changes in living that would be necessary. If you write about Antarctica becoming warm, you may wish to include an imaginative map of the continent and nearby islands to illustrate your story.

7. Read books about Antarctic explorations, such as *Alone* by Richard E. Byrd, and *Operation Deepfreeze* by Admiral George J. Dufek. Share interesting parts of the books with others through written or oral reports.

8. Make up a chart in which you draw comparisons between certain conditions in lands within the Arctic Circle and lands within the Antarctic Circle. Use such headings as: average annual precipitation; average height above sea level; average winter season temperature; average summer season temperature.







# LATIN AMERICA

Latin America is the name given to the land of the Western Hemisphere south of the United States. Do you remember why this region is called Latin America? (The Spanish and Portuguese, who explored and colonized most of Latin America, spoke languages based on Latin.) Today, most of the people living in these lands speak Spanish. In Brazil, which was once a Portuguese colony, the people speak Portuguese. In many parts of rural Latin America, especially in highland areas, native Indian dialects are still used by most people. Some other languages are also used.

There are 21 independent republics and one Communist-controlled country in Latin America. Ten of these republics are in South America, and eleven are in southern North America and the West Indies. The Communist-controlled country is the island of Cuba. In addition, there are a number of areas controlled by other nations. Most of these are small islands, but three areas on South America are still colonies of European nations.

**Why Latin America Is of Interest.** We have many reasons for being interested in the countries and people of Latin America.

Among them are the following: (1) These lands are close to us geographically. The northern border of Mexico is the southern border of the United States. Cuba, in the West Indies, is only a short flight from Florida by plane. The other lands of Latin America are easily reached from the United States and Canada by plane or boat. The Pan American Highway is now being built through countries on the two continents. When it is completed, a person will be able to drive through all the mainland countries of the Western Hemisphere. (2) Canada and the United States carry on extensive trade with most Latin American countries. The United States imports tropical foods, mineral-rich ores, hardwood lumber, petroleum, and many other products from Latin America. Manufactured goods made in the factories of the United States and Canada are exported to most countries of Latin America. (3) Businessmen from the United States and Canada have invested much money in Latin American industries. Men and machines have been sent to these countries to help develop their resources and start new industries. (4) The music, art, literature, and architectural styles of



Latin America are popular in the U.S.A. and Canada. Books, magazines, and motion pictures are exchanged. (5) The Panama Canal, owned and operated by the United States, gives citizens of the United States a special interest in Central America. This canal provides a water highway between the eastern and western coasts of Western Hemisphere lands. (6) The Latin American countries are steadily becoming more important in world affairs. All of the republics are members of the United Nations. Their representatives take an active part in the work of the General Assembly and the specialized agencies of the United Nations. (7) Latin America has the fastest growing population of any major region in the world. The standard of living of many people is quite low. (8) Communists have taken over the government in Cuba and are trying to do so in several other places. It is important to the U.S.A. that these countries remain free and independent.

**Location and Land.** The best way to understand the location of Latin America on the Earth is to look at a globe or the world map on pages 390-391. Notice that Latin America extends from about 32° North to about 56° South. This north-south distance is greater than that of any other major world region.

Notice, also, that Latin America extends from about 35° West to about 117° West. Latin America thus covers a very large area, and contains more land than do Canada and the United States together.

As the map on page 50 clearly shows, much of Latin America, especially through Central America and along the western coast of South America, is mountainous. East of the mountains in South America are broad plains drained by mighty rivers. Eastern South America also has some highland areas, although lower in altitude than the mountainous regions along the western coast.











## QUESTION BOX

6

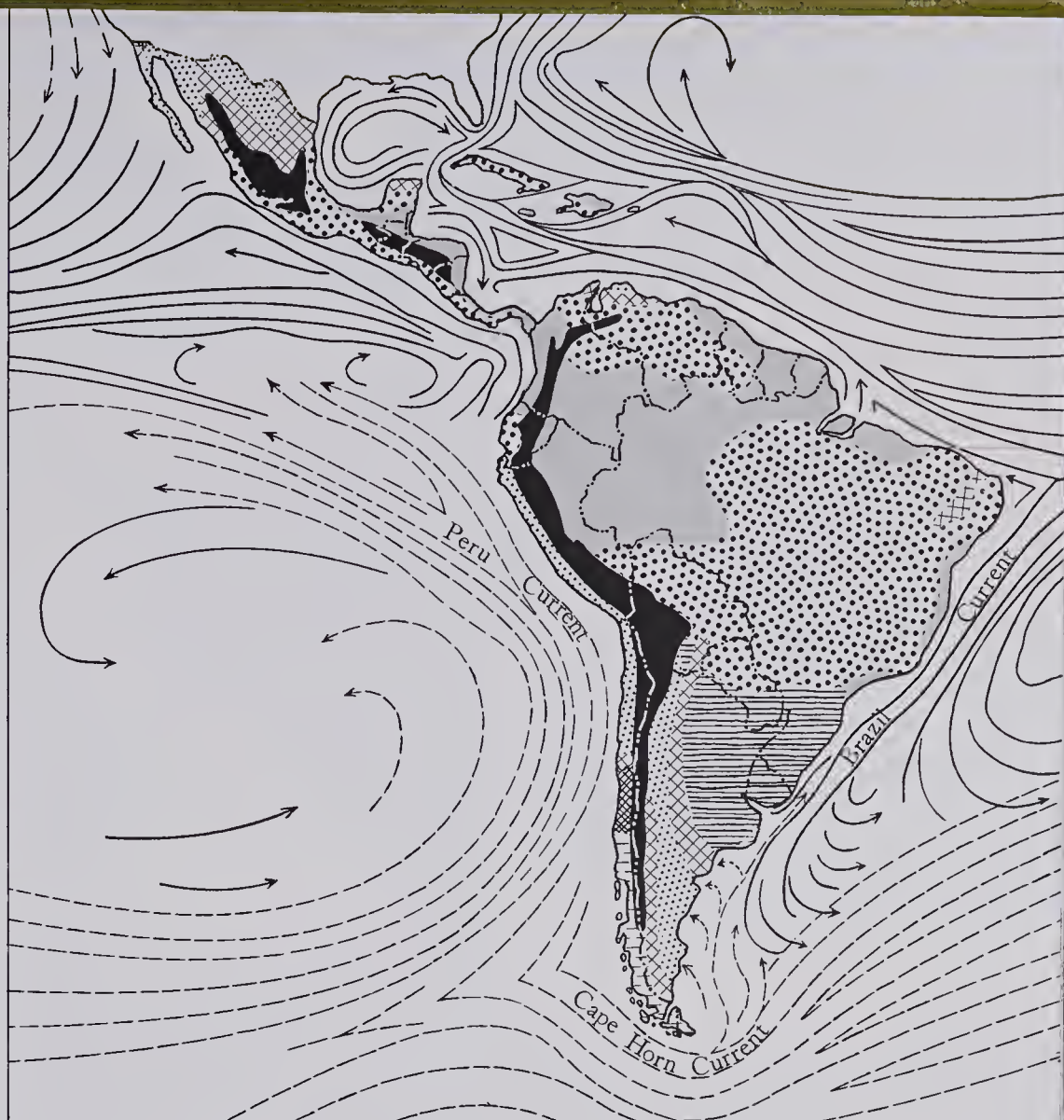
1. What are the two main languages spoken in Latin America?
2. How many independent republics are there in Latin America?
3. Why is Latin America of interest to the people of the United States and Canada? (Give several reasons.)
4. In what way is Latin America larger than any other major world region?
5. Which has more land area, Latin America or the United States and Canada?
6. Where in Latin America are the highest mountains located?

**The Climates of Latin America.** The climates of Latin America are quite varied, partly because of the latitudinal extent of the region, and partly because of the region's altitude and **topography**. Topography is a word used by geographers and by cartographers. It means the surface features of an area including the location of mountains, rivers, hills, and other land forms. Throughout most of Latin America, however, there are three main types of climate. Near the equator, many areas have a *tropical rain forest* climate. Such a climate is sometimes called *humid tropical*. Areas with this kind of climate have heavy rainfall all during the year. Broadleaf evergreen trees, many of them hardwoods, cover much of the land. North and south of the tropical rain forest are regions which have a *tropical savanna* climate. In these areas, most of the land is covered with grass, but there are groves of trees scattered here and there. Areas which have a tropical savanna climate are warm throughout the year. Considerable rain falls, but there are periods with little rain. Another section of Latin America has a *humid sub-tropical* climate. This climate

# CLIMATES AND OCEAN CURRENTS IN LATIN AMERICA

- |   |  |
|---|--|
|  | Tropical rainforest<br>or humid tropical |
|  | Tropical Savanna                         |
|  | Humid Subtropical                        |
|  | Mid-latitude Marine                      |
|  | Mediterranean                            |
|  | Desert                                   |
|  | Semiarid steppe                          |
|  | Highland                                 |
|  | Warm current                             |
|  | Cold current                             |

Note the large area in South America with a tropical rain forest climate. Both temperature and humidity are high every day in such areas. Notice the ocean current that flows along the Pacific Coast of South America. It is called the Peru Current.

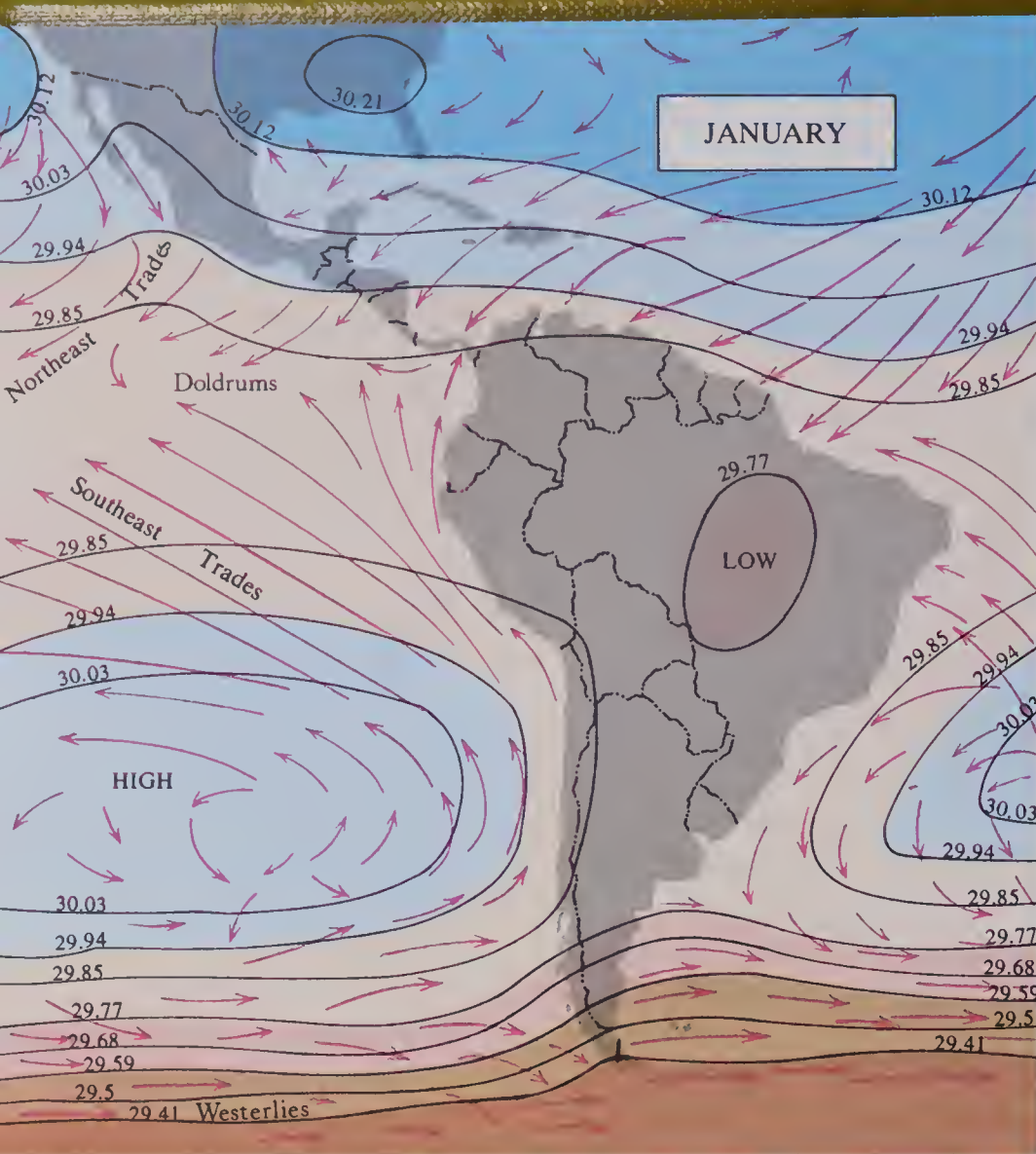


is much like that along the Gulf Coast of the United States. Considerable rain falls all during the year. While the weather is occasionally cool, killing frosts are rare.

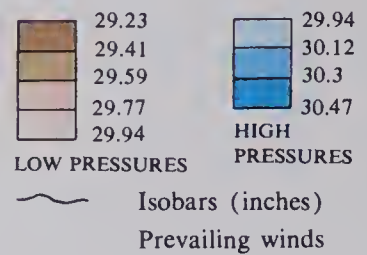
Other types of climate also are found in Latin America. Dry, or *desert*, climates are found in several places where little rain falls. (See the map above.) The climate high in the mountains of western South America can best be described as a *highland* climate. The temperature is always cool, and snow falls on the high peaks during winter months. On the west coast of southern South America there are areas which have a Mediterranean climate or a mid-latitude marine climate. As you remember, a *Mediterranean* climate is one in which moist, cool winters are followed by hot, dry summers. A *mid-latitude marine* climate, on the other hand, is one in which considerable rain falls all during the year, and the weather usually is cool.

**Isobars and Isotherms.** Additional information about climate in Latin America can be gained by looking at the two maps on page 40. As the legend indicates, these maps show **atmospheric pressure** and **prevailing winds**. Atmospheric pressure is caused by the weight and quantity of the air around us. A cubic foot of air at sea level is very light, but the weight of a cubic foot of air is even lighter at higher altitudes. The total weight of air pressing on the Earth is immense because there is a great amount of it. The air in the upper atmosphere presses upon the air beneath, causing increasingly higher air pressure closer to the Earth. At sea level, the air pressure is approximately 15 pounds per square inch. Atmospheric pressure is measured in inches by an instrument called a **barometer**. The number of inches of mercury that air pressure will hold in a glass tube is the barometric pressure. At sea

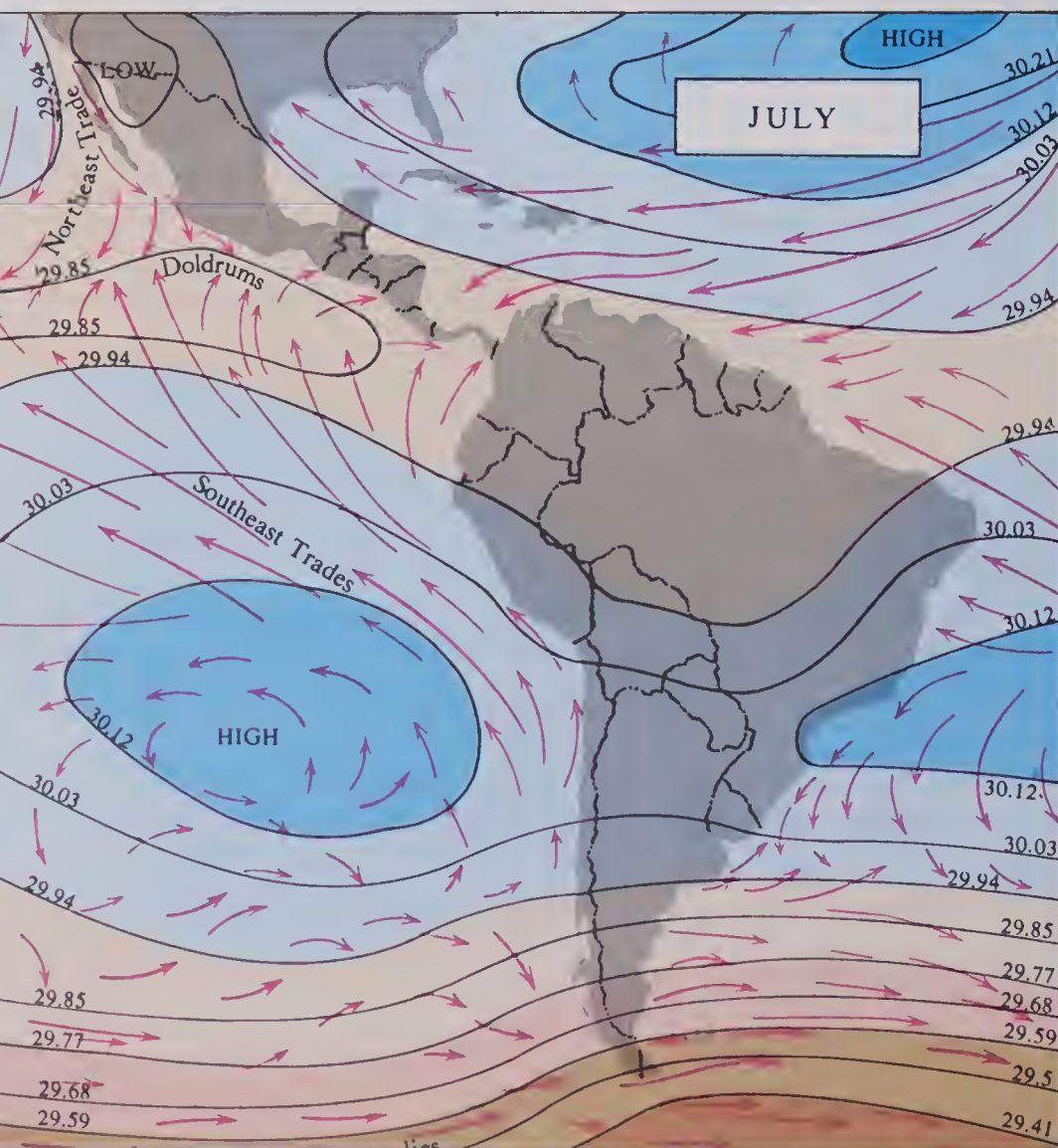




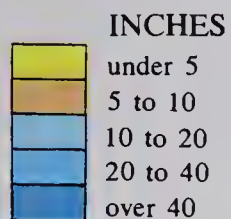
# ATMOSPHERIC PRESSURE AND PREVAILING WINDS IN LATIN AMERICA



The maps on this page show average barometric pressures and prevailing winds during January and July. The lines that connect places having the same barometer readings at the same time are called isobars. High pressure and low pressure areas are called *highs* and *lows* by weathermen. Usually, winds blow from a high to a low; note, however, that they do not blow directly from north to south or east to west. Due to the rotation of the Earth, prevailing winds are deflected and they blow at an angle.

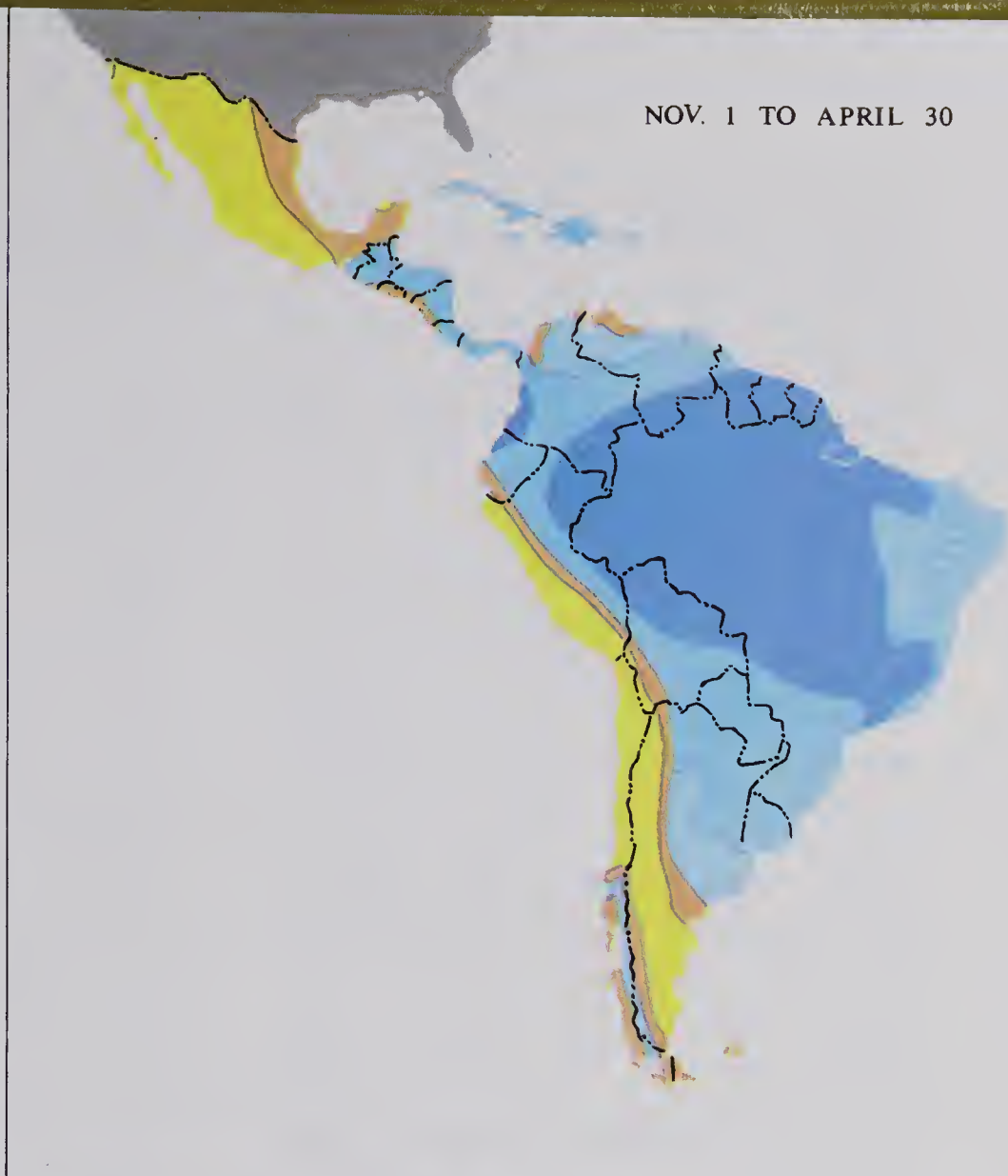


# AVERAGE RAINFALL IN LATIN AMERICA



The two maps on this page show the amount of rain that falls in Latin America during six-month periods. During what period does the most rain fall in the Amazon Basin? Note the period in which Central America receives its heaviest rainfall. Does Brazil have its season of heaviest rainfall during that time? Notice the long, narrow portion of land along the west coast of South America that receives very little rain. What kind of land do you think would be found there? Would this land be good for farming?

NOV. 1 TO APRIL 30



MAY 1 TO OCT. 31





level, this is usually about thirty inches. Weather forecasters use a barometer to predict what the weather will be like a few days in advance. A rapid drop in air pressure as shown by a barometer usually means stormy weather is coming. Rising barometric pressure usually means several days of good weather.

The lines drawn on the maps on page 40 are called **isobars**. *Isobar* comes from two Greek words, *iso* meaning *equal* and *bar* meaning *weight*. Isobars are drawn to connect places having equal atmospheric pressure as measured by a barometer.

You undoubtedly have seen television weather forecasts in which "highs" and "lows" are located on a map. **High pressure** areas develop where air cools, compresses, and sinks toward the Earth. **Low pressure** areas develop where air warms, expands, and rises from the Earth. High pressure generally brings fair weather; low pressure, unsettled weather. Centers of high and low pressure are caused by the unequal heating of the Earth between the equator and the poles. Because the Earth is heated more consistently near the equator, the warm air there tends to rise. Cooler air from polar areas flows toward the equator. If the Earth did not rotate, the cold, heavier air from polar lands would flow directly north and south toward the equator. In the Southern Hemisphere, because of the Earth's rotation, highs flow in a counterclockwise direction. In the Northern Hemisphere, they flow in a clockwise direction. Lows are reversed, flowing clockwise in the Southern Hemisphere and counterclockwise in the Northern Hemisphere.

**Prevailing winds** are winds which blow rather consistently in the same direction. As the maps on page 40 show, southern South America has prevailing westerly winds, that is, winds blowing from the west. The area in low latitudes in Latin

America, by contrast, is affected primarily by the **trade winds**. Because of the rotation of the Earth, the trade winds flow in a curved direction from northeast to southwest, or from southeast to northwest. South of the equator, these winds are called the southeast trade winds because they blow from the southeast. North of the equator, they are called northeast trade winds.

If all the Earth were land or water, it would heat and cool more evenly and our weather would be more even all of the time. Uneven heating and cooling, plus rotation of the Earth, provide us with changeable weather.

Look at the maps at the right. Notice that these maps show average temperatures in Latin America for the months of January and July. The lines shown on the maps are called **isotherms** or **isothermal lines**. The word *isotherm* comes from two Greek words, *iso* meaning *equal* and *therm* meaning *heat*. An isothermal line is drawn on a map to connect places which have the same temperature at a given time, or the same average temperature for a given period. On these maps, the isotherms show temperatures at 10° intervals. Notice how much of South America has temperatures averaging 80° in January. Notice, also, how much of the northern part of the continent has similar temperatures in July.

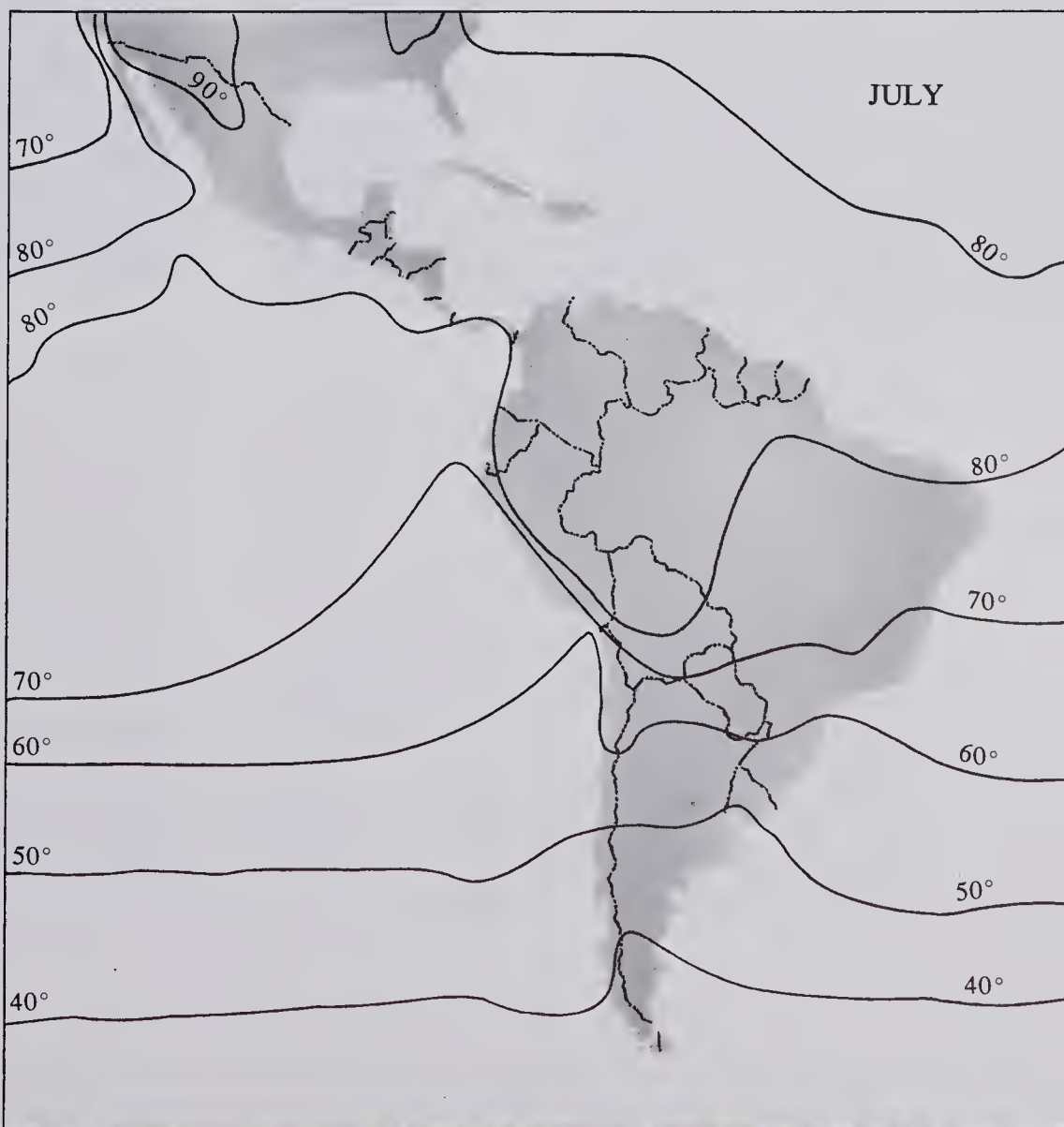
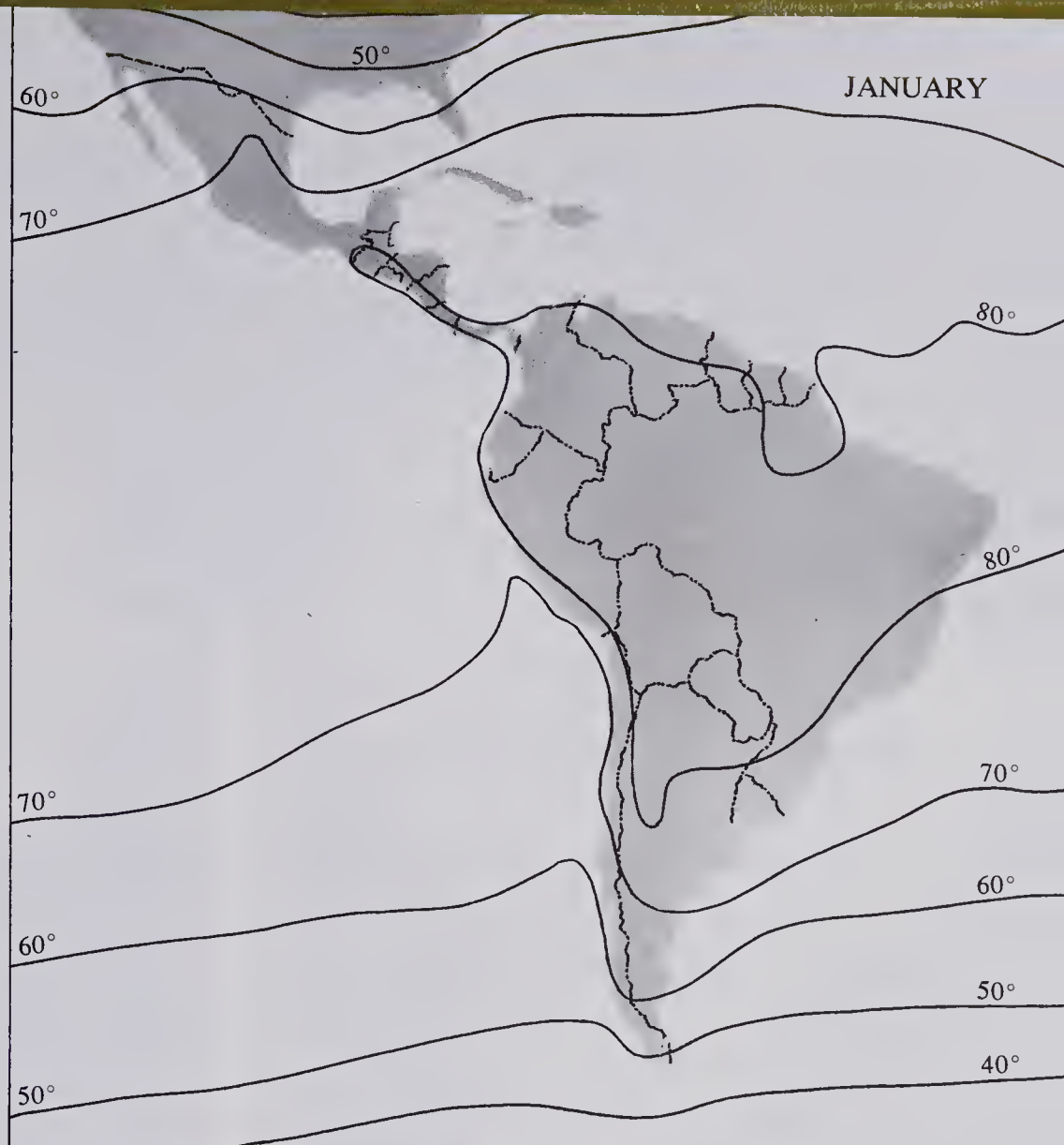
**Population of Latin America.** Latin America is the region in the world which now is having the greatest population gains. Natural increase, the excess of births over deaths, is high. In addition, immigration from other regions of the world adds many new citizens to Latin America each year.

Although Latin America has a rapidly increasing population, many areas of the region still are almost uninhabited. Look at Table VI in the Appendix to see how unevenly the population is distributed. A number of the islands in the West Indies,

AVERAGE  
TEMPERATURES  
IN  
LATIN AMERICA









— Isotherms at  
10 degree  
intervals

The lines drawn on the two maps at the right show average temperature readings in Latin America during January and July. These lines, called isotherms, are drawn at ten-degree intervals. Temperatures in highland areas, however, will differ depending upon how high the land is above sea level.





## LAND USE MAP OF LATIN AMERICA

	Land unused or slightly used		Grazing
	Family farming		Cash crops
	Mixed family farming and cash crops		Lumbering
			Industrial regions
			Mineral products

This map shows Latin American land use. Note the large areas that are used slightly or not at all. As you learn about the people, land, and climate, you will understand why.

including Puerto Rico, are very densely populated. By contrast, French Guiana, in South America, has less than one person per square mile. Other areas in Latin America, such as the largest country, Brazil, have few people per square mile, but very high population density in urban areas. Also, look at the population map of Latin America on page 54. This map clearly shows that a great majority of the people of Latin America live near the coasts.

Although most of the people who live in Latin America speak similar languages, they have different ancestries. In Mexico and several countries in Central and South America, a large number of people have Indian ancestors. Most of the people in Argentina, Uruguay, and Costa Rica, however, have European ancestors. In the islands of the Caribbean, and coastal lands surrounding it, many people have ancestors who were Negroes. Throughout Latin America, many persons are known as *mestizos*. A mestizo is a person with mixed ancestry, usually a combination of European and Indian.

**Likenesses and Differences.** The people of Latin America are similar in a number of ways. One way is their *religious life*.

Almost all of the people are members of the Roman Catholic Church. The Spanish and Portuguese who colonized these countries were members of the Catholic Church. Priests who came with the early colonists converted most of the Indians to the Catholic religion. Latin Americans have been influenced in other ways, also, by the culture of Spain and Portugal. Culture is a word used to include the thinking and acting of a group of people. Manners and customs, religion, art, music, literature, and education are part of a people's culture.

## MINERAL RESOURCES OF LATIN AMERICA

● Iron	○ Tungsten	■ Gold
● Coal	○ Manganese	● Sulfur
↑ Petroleum	◇ Diamonds	+ Zinc
● Copper	▲ Bauxite	■ Nitrate
● Lead	+ Tin	○ Silver

This map shows where major mineral and underground resources are found in Latin America. Note that many of the mineral deposits are located near coastal areas.

The *economic life* in Latin America is much the same from place to place, also. In almost every country, most of the people make their living on small farms and use ancient methods of farming. They barter or trade some of their produce to other farmers and to shopkeepers rather than use money. In most countries, however, there is some commercial agriculture as well. Large plantations and *haciendas*, which is a Spanish word for ranches, have been established, usually by persons from the United States or Europe. The products of such large farms and ranches are partly exported to overseas markets.

Mining is important as an occupation in most of Latin America. Good deposits of iron ore, bauxite, copper, silver, and nitrates have been found. Since many areas are comparatively unexplored, more mineral wealth may be found in the future. A number of very important oil fields have been established. Venezuela, for instance, is a leading nation in exporting oil.

Until recently, manufacturing developed slowly in South America. Now, particularly in Argentina and Brazil, development is very rapid. Throughout Latin America, manufacturing plants are being built and more and more persons are earning their

living by working in industry. Nevertheless, major industrial cities are found only in Argentina, Brazil, and Mexico. Transportation and communication are being rapidly improved in Latin America.

A third way in which Latin American nations are alike is that they are *politically unstable*. In the United States and Canada, government is firmly established and stable. Occasionally, the party in power loses an election, but the winning party takes over the government peacefully, calmly, and without difficulty. In most





of Latin America, however, governments are much less stable. Usually, political changes are violent rather than peaceful. Revolutions, in which the government in power is overthrown, often occur. The army often takes an active part in politics. This instability in government may be partly due to generally low income and low educational standards in Latin America. On the other hand, the reverse may be true. Political instability may be the *cause* of generally low standards of living and education. Watch the newspapers as you are studying Latin America. It is not unusual for a government or two to be overthrown each year.

The low level of education and the low standard of living result largely from a fourth way in which Latin American countries are similar. *Inefficient use is made, generally, of resources.* The talents of many people are not developed because of lack of education. Some land which should not be farmed is being farmed. Some fertile land, which is well-located for agriculture, is not used. Mineral ores are crudely mined and inefficiently smelted in some areas.

Because these generalizations can be made about Latin America does not mean that the countries and peoples are entirely similar. Countries differ in many ways, and the people are justly proud of their own countries. They do not wish to be classified as Latin Americans. Rather, they wish to be known as Peruvians, Brazilians, or whatever their nationality is. With all of their problems and needs, they are people with pride and honor.

Through the years, the people in these countries have not become well acquainted. Distances from one place to another are great, and overland transportation is poorly developed in most areas. As a result, it generally has been hard for many people in any nation of Latin America to visit

other lands in the region. Although more roads have been built recently, the airplane is the only easy way of reaching the interior of most of these countries.

**Main Parts of Latin America.** For presentation in this book, Latin America is divided into a number of major parts. The largest part is the continent of *South America*. It contains most of the land and resources of Latin America, and most of the region's people live there. Northwest of South America is *Central America*, which contains six republics and one colony. The *West Indies* are the islands in and around the Caribbean Sea. The most northern country of Latin America is *Mexico*, which shares a border with the United States.

## QUESTION BOX

### 7

1. What are the following kinds of climate like: tropical rain forest, tropical savanna, humid sub-tropical, desert, highland, Mediterranean, mid-latitude marine?
2. Why does Latin America have such a variety of climates?
3. What is an isotherm? What is an isobar?
4. What are "highs" and "lows"? How are they caused?
5. What are prevailing winds? What are trade winds?
6. Why do we have changeable weather on the Earth?
7. Why is the population of Latin America growing rapidly?
8. Is the population of Latin America evenly distributed? (Give several examples.)
9. What is the ancestry of the Latin American peoples?
10. In what ways are the countries and peoples of Latin America similar?
11. What factors have been important in causing these similarities?

## GLOBE AND MAP ACTIVITIES

Using the maps on pages 40, 41, 43, 53, and Table X in the Appendix, work out answers to the following questions:

1. What is the average annual rainfall in the following places: (a) near Brasília, Brazil; (b) near Antofagasta, Chile; (c) near Panama City, Panama; (d) near Montevideo, Uruguay; (e) near Recife, Brazil; (f) near Iquitos, Peru?

2. How is the land used in the areas listed in Question 1?

3. Which of the following cities have temperatures which average less than 80° during summer months: (a) Brasília, Brazil; (b) Santiago, Chile; (c) La Paz, Bolivia; (d) Buenos Aires, Argentina; (e) Manaus, Brazil?

4. Which of the cities mentioned in Question 3 have average temperatures of less than 60° during winter months?

5. Prevailing winds blow from what direction at: (a) the southern tip of South America; (b) Rio de Janeiro, Brazil; (c) Georgetown, British Guiana; (d) Valparaíso, Chile; (e) Recife, Brazil?

6. During which month, January or July, does southern Brazil have the highest atmospheric pressure? In what season is that month?

7. Does any part of South America have an average atmospheric pressure of 30.0 inches in January?

8. What is the lowest isobar drawn on either map? Where is it drawn? In what month and season does this area have the lowest atmospheric pressure?

9. List five of the largest rivers in South America and tell in which general direction each river flows.

10. Locate the following mountain peaks and be prepared also to locate them on a large wall map: (a) Mt. Aconcagua; (b) Mt. Bonete; (c) Mt. Chimborazo; (d) Ojos del Salado; (e) Mt. Cotopaxi.

11. By looking at the climatic maps of South America and the map on page 53, which shows the ground cover, be prepared to point to an area where each of the following types of climate may be found: (a) tropical rain forest; (b) tropical savanna; (c) humid subtropical; (d) desert; (e) highland; (f) Mediterranean; (g) mid-latitude marine. Also be prepared to explain *why* you selected the area you chose. Then check your answers with the map on page 39.

## OTHER LEARNING ACTIVITIES

1. Obtain a weather map from the nearest United States Weather Bureau and learn to read all the symbols used on such maps. You may wish to order daily Weather Maps from the Superintendent of Documents, Washington 25, D.C. (60¢ a month, \$7.20 a year). Then you could practice weather forecasting.

2. Visit the nearest United States Weather Bureau to learn about the instruments used to measure wind velocity, humidity, air pressure, temperature, and precipitation. For a month, keep a record of the official weather forecasts and what the weather actually was like. Attempt to answer this question: How accurate are United States Weather Bureau forecasts?

3. Read the Golden Nature Guide pocket-book on *Weather* and report to the class on the information this book contains. Written

by Paul E. Lehr, R. Will Burnett, and Herbert S. Zim, the book is available in most book stores and in many drugstores and supermarkets.

4. Prepare a one-page report on one of the following topics: (a) High and low pressure areas; (b) The atmosphere; (c) Fronts and frontal weather; (d) What causes storms; (e) The effect of topography on weather; (f) Air masses and their influence on weather.

5. On a large globe or world map, measure the latitudinal extent of each of the following major regions: Latin America; United States — Canada; Europe; U.S.S.R.; Middle East and North Africa; Africa, South of the Sahara; Southern and Eastern Asia; Australia. Figure out each distance in *miles* and make a chart showing the latitudinal extent of each.









## SOUTH AMERICA

The largest portion of Latin America is the continent of South America, as we have learned. South America is somewhat smaller than North America, as the map on page 390 shows. (Use figures in the Appendix to compare the sizes of the two continents.) Most of South America is in low latitudes. None of it extends southward far enough to be in high latitudes. The equator crosses the northern portion of the continent.

South America is considerably east of North America. Notice on the map that the western coast of South America is almost directly south of the eastern coast of Florida. Only a few places in the eastern part of North America are directly north of places in the western part of South America.

**Similarities and Differences between the Continents.** South America is in several ways much like North America. In general shape and topography, for instance, the two continents are quite similar. Both are broad in the north and narrow in the south. Both have high mountain ranges near the western coast and lower highlands near the eastern coast. As the map shows, the

high mountain ranges in western South America are closer to the coast than those in North America. The great mountain system which extends through both continents is known as the Cordilleran system. **Cordillera** is a Spanish word meaning a major mountain range or system of ranges. It comes from the word *cuerda*, meaning rope or string. In South America, the mountains of this system are known as the Andes. In North America they are called the Rocky Mountains.

Between the mountain ranges are high, fairly dry plateaus and basins. Streams flow from the snow fields in the high mountains across these dry areas. In some places, they disappear into the dry land or evaporate into the air.

The highland areas near the eastern coasts of both continents are not as rugged nor as high as the Cordilleran system in the west. In eastern South America, there are two highland areas. One of these, in eastern Brazil, is known as the Brazilian Highlands. This area is separated from another area, the Guiana Highlands, by the broad basin of the Amazon River. Similarly, the highlands areas in eastern









*Left.* Logs are hauled from a forest in Chile. *Right.* Lumbering in a Canadian forest. How are these areas alike?

North America are separated by the Great Lakes and St. Lawrence River Basin.

Both continents have vast interior plains. In South America, the plains are drained by two great river systems—the Amazon and the Plata. In North America, the plains are drained by the Mississippi River and its tributaries and by the Mackenzie River.

One of the most notable differences between the two continents is in climate. Because of South America's location, seasonal changes are not nearly as varied as they are in North America. Throughout most of the continent, the sun is always high in the sky, and day and night are about equal in length throughout the year. The main seasonal difference is in the amount of rainfall. Most of the areas in South America north of the Tropic of Capricorn have rain throughout the year. Some areas have a very rainy season and a drier season, and some near the equator have fairly heavy rainfall all year long. As we study the different countries of South America, we shall learn more about differences in climate from place to place.

**Transportation.** Transportation facilities throughout most of South America are limited, although in recent years advances have been made. Many people still depend on animals for transporting goods. High mountains, rough terrain, and thick tropical growth in many parts of this continent

make the building of extensive rail or highway systems difficult and expensive. Roads and railbeds are frequently washed out during heavy rains.

Most of the railroads are found in Argentina, Brazil, and Uruguay, wherever steep mountains or dense forests do not hinder construction. The most extensive highway systems, linking major cities, are found in Argentina, Brazil, Venezuela, and Uruguay. Other countries are now trying to connect their principal cities and farming areas by adequate road systems.








Transportation by air, which is not limited by the difficulties already mentioned, is frequently used. Many people travel by air, and the amount of cargo carried by airlines is increasing.

However, most heavy cargo is carried either by coastal steamer, truck, or river boat. Coastal shipping is very important to countries such as Brazil and Chile, and more than 21,000 miles of South America's rivers are navigable. Most of these rivers are on the Atlantic side of the continent.

**Natural Resources.** South America has a number of important mineral resources. Among these are iron ore, petroleum, bauxite, tin, copper, nitrate, and silver. The continent has little coal (or little that has yet been found), which unfortunately hinders industrial development. The coal which has been discovered is not of good



## MAJOR TRANSPORTATION ROUTES AND CENTERS IN LATIN AMERICA

- |   |   |
|---|---|
|  Railroads                           |  Seaport                           |
|  Pan-American Highway                |  International Airport             |
|  Other roads                         |  Seaport and International Airport |
|  Navigable Rivers and Steamer Routes |   |

Study this map and the one on the next page. Are most of the extensive rail and highway systems in South America found in mountainous regions or in fairly level areas?

coking quality. Mineral resources, generally, are located a considerable distance from the coast in mountainous areas. The transportation of ores to coastal ports is expensive, so ores cost more than they otherwise would.

Although much of South America has soil of poor quality for agriculture, there are several large regions with very fertile soil. Poor agricultural practices of the past, including little use of fertilizers, have decreased the fertility of soils in many areas.

South America has tremendous resources of timber, particularly in the vast rain forests. These resources are of limited value at present, because marketable trees are scattered here and there throughout the forest. Different kinds of trees scattered in this manner make up what is called a **mixed stand**. The reverse of a mixed stand is a **pure stand**, made up of one kind of tree. Logging operations are much more expensive in a mixed stand, because of the difficulty of locating and cutting the marketable trees.

Later, we shall learn in more detail about South America's natural resources and how they are being developed.

**Population Growth and Distribution.** As we have learned, population growth in

Latin America is very rapid. The map on page 54 shows that the population is very unevenly distributed in South America. Many places on the continent are practically uninhabited. Other places, such as Buenos Aires, São Paulo, and Rio de Janeiro, are crowded cities. As the map shows, almost all the large cities and heavily populated areas are near the coast. In low latitudes, however, there are a few crowded centers of population in mountainous areas. People choose to live in these areas because the climate is cooler and more comfortable there than on the





## SOUTH AMERICA

0 300 600

Scale 600 miles to one inch

ICE AND SNOW

FORESTS

SAVANNA

GRASSLAND

TROPICAL RAIN FORESTS

DRY GRASSLAND

FARMLAND

DESERT

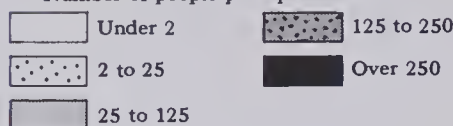
MOUNTAINS

Parabolic Equal-area Projection



## POPULATION MAP OF LATIN AMERICA

Number of people per square mile:



hot, humid coastal lands. Unlike North America, much of the interior of South America is almost uninhabited.

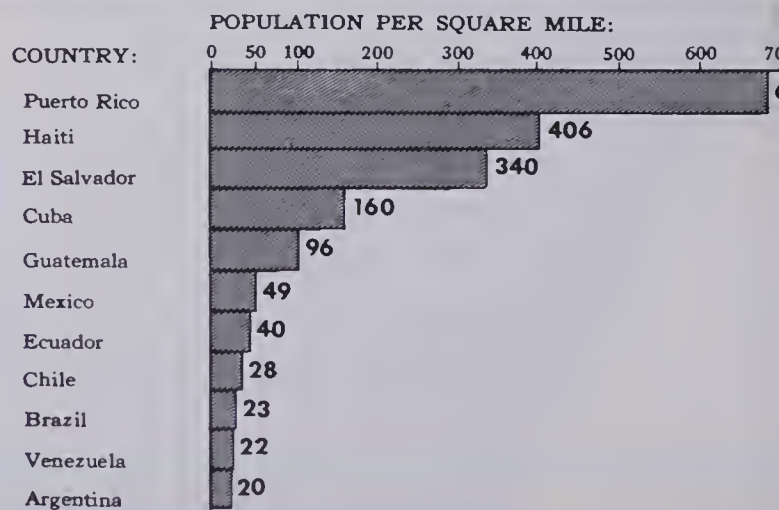
**Religious Life.** Throughout all of South America, most people belong to the Roman Catholic Church. The relation of the Church to the government varies from country to country. In some countries, the Church is supported by the government. There is freedom of worship in most countries, however. Many Protestant churches have small followings, and some support mission schools in South America. Nevertheless, in most places, Catholic holy days are national holidays, and the Church has much influence on political and economic life. By contrast, in the United States and Canada, there are many different religions. No one faith or belief is held by a majority of the people. No church is supported by the government.

**Economic Life.** Most people in South America make their living from subsistence agriculture. Subsistence agriculture is that in which the farmer raises only enough food and fiber for his own needs. He trades some of his crop yields for other needed goods. In some areas in South America, particularly in middle latitudes, commercial agriculture is carried on. In these areas, cash crops are raised on large plantations. Much of the land is owned by only a few people, however, and workers are employed for very low wages. Most of



The map above shows the population distribution in Latin America. Note the population of the coastal and inland areas. Where are the heavily populated regions?

### POPULATION DENSITY IN SELECTED COUNTRIES



the people in rural South America, therefore, are poor. Many of them seldom, if ever, see or use money. They barter whatever goods they have for other goods on market days. Much work is still done by hand, which naturally results in low productivity per worker. Nevertheless, many of the products which are made by hand are of very high quality.

In urban areas of South America, however, the standard of living is closer to that in the United States and Canada. In Argentina and Brazil, particularly, there are many factories in urban centers. The standard of living for the wage earner is rapidly rising in such centers, but many people still are unemployed and poor.

**Possibilities for the Future.** In spite of all its problems, South America is making rapid strides toward industrialization. Whether or not the development of resources and industry will be rapid enough to offset the rapid rise in population is not known. In a number of countries, large estates are being broken up into smaller farms, and new land is being brought under cultivation. Better use is being made of mineral resources. Many new factories are being built. It is hoped that the standard of living and that the standard of education will be raised rapidly in South America. To achieve that goal, much hard work will be required of all the people.

Eight nations of South America recently formed a common market similar to that formed in Europe. Argentina, Chile, Uruguay, Paraguay, Brazil, Peru, Colombia, and Ecuador agreed to lower taxes on imported goods and work together for economic improvement. Bolivia, which is surrounded by these countries, joined the common market at first, but later withdrew. Mexico, located at the northern end of Latin America, also agreed to work with the Latin America Free Trade Association. This development probably should speed

industrialization and result in better use of natural resources in South America.

**A Look Ahead.** The next four sections of the book will present information about each of the republics and the dependent states of South America. The first section will include the countries in middle latitudes—Chile, Argentina, and Uruguay. The second section will cover the countries in which more than half the population has Indian ancestors. These countries include Paraguay, Bolivia, Peru, and Ecuador. The third section will present information about the continent's largest nation, Brazil. The final section will include the countries north of the equator—the Guianas, Venezuela, and Colombia.

## QUESTION BOX

### 8

1. What is the location of South America relative to North America?
2. What similarities are there between these two continents in shape and topography?
3. What does *cordillera* mean?
4. How do the two continents differ in climate? Why?
5. Why are many parts of South America without adequate rail or road systems?
6. Where do most of the people live in South America?
7. What differences exist in the relationship between church and government in South America and North America?
8. What important mineral needed for power is found in limited amounts in South America?
9. Why are costs of extraction for minerals and lumber high in South America?
10. What have nine nations of Latin America recently done to try to encourage industrialization?



# MIDDLE LATITUDE COUNTRIES

## CHILE



**A Long Narrow Land.** Chile is a very long and very narrow land. Study it on the map at the left. Chile extends about 2,630 miles from north to south. If placed along the west coast of North America, Chile would reach from the tip of Lower California to Juneau, Alaska. Although it is 221 miles wide at its widest point, Chile has an average width of only 109 miles throughout its length. If the countries of South America were listed according to size, Chile would be exactly in the middle of the list; six countries are larger, and six are smaller.

**The Land of Chile.** The land of Chile can be divided into four natural regions: north, middle, south, and Atlantic. In all regions except the Atlantic, which is in the far south, there are three main land features. In the east, along the borders with Argentina and Bolivia, are the high Andes Mountains. In the west, near the coast, is a much lower coastal range. Between these ranges, especially in the central part of the country, is a long narrow valley where most of the people live.

Almost all of Chile north of 30° South is part of the Atacama Desert. This desert is one of the driest regions in the world. One reason for this dry climate is a cold current from the Antarctic, known as the Peru Current, which flows along the coast of Chile. Prevailing westerly winds are cooled over the water, and then are heated as they blow over the land. As they become warmer, they can retain more moisture. The high Andes also shut out the winds from the Atlantic. As a result, no rain falls for years at a time in this region. Only one river, the Río Loa, flows constantly across this desert from the Andes to the Pacific. Other streams, at least part





*Left.* Farmers harvest a wheat crop in Chile. *Right.* A large portion of Chile's food crops are raised in the irrigated fields of the central valley.

of the time, disappear into the loose gravel of the desert or evaporate into the dry air. There is almost no plant life. The few people who live in this region live either near the foothills of the mountains, where streams flow onto the desert floor, or near mines. Nevertheless, this part of Chile is very important to the country because of its rich mineral deposits.

The middle region of Chile, extending from 30° to 43° South, is the heart of the country. Between the coastal range and the Andes is a central valley extending about 550 miles in length and ranging from 30 to 150 miles in width. The central valley is not level because many hills and spurs from the Andes extend into it. Streams flowing from the Andes during

the summer furnish water for irrigation and power. These streams have carried soil from the mountains to this valley region for years. Such soil is called **alluvial** soil. Alluvial deposits usually are fine for raising crops, and Chile's central valley is a fertile farming region. Many people live in the valley.

Middle Chile has a Mediterranean climate. Do you remember what kind of climate this is? Winters are mild with considerable rainfall. Summers are warm and dry. In the southern part of this middle region, winters are colder and summers are cooler than they are farther north.

As you can tell by looking at the map, the southern region of Chile has hundreds of islands along the mainland coast. These

*Left.* A view of the Andes and the central valley near Santiago. *Right.* A Chilean fishing village. Fish abound in the cold coastal waters.





islands are the peaks of the coastal range. This area is much like western Canada and southeastern Alaska, with many beautiful fiords, lakes, and snow-capped mountains. Several of the mountains are active volcanoes. Strong westerly winds bring rain throughout the year. Forests cover much of the land, and grassy meadows are scattered here and there through the forested area. Tourists enjoy skiing, fishing, boating, and other outdoor sports on the mountains and lakes.

In the extreme south, Chile extends along the Strait of Magellan to the Atlantic Coast, and includes the western part of Tierra del Fuego. This part of Chile is cold, fairly dry, and very windy. Sheep raising is the occupation of most of the people, but petroleum production is growing in importance.

**The Andes Mountains.** The Andes Mountains are a great barrier between Chile and Argentina, except in the far south. They are the highest mountains in the Western Hemisphere. The only higher mountains are in south central Asia, including the Himalaya, Hindu Kush, and Tien Shan ranges. Along the border between Chile and Argentina are more than 20 peaks higher than 20,000 feet. The highest of all is Mount Aconcagua, which is 22,834 feet above sea level. Its peak actually is in Argentina, but the base of the

San Martín's army, recruited in Argentina, drove the Spaniards from Chile in 1817.



mountain extends westward into Chile. Glaciers cover large areas of the mountains, especially in the south where snowfall is usually heavy. Little snow fell for a two-year period recently, however. The drought almost put sheep raisers out of business.

**Brief History.** Little is known about the history of Chile until 1535. At that time, an expedition of Spaniards worked its way south from Cuzco, the ancient Inca capital in southern Peru. They found a hot, dry desert in northern Chile. They also found Indians, whom they named Araucanians, living south of the desert. Several years later, another Spanish party led by Valdivia started the first European settlement in Chile at Santiago. It is now the capital of Chile. Valdivia, a province in south central Chile, and a city by the same name, honor the founder of Santiago.

The Araucanians did not want a Spanish colony established. For a hundred years they continued to fight the Spanish. In 1641, however, a treaty was signed giving the Indians the land south of the Bío-Bío River. Find this river on the map on page 56. Some skirmishes continued even after this time, because the Europeans kept moving southward. In 1825, the government gave the Araucanians full rights as citizens of Chile. Today, most of the Indians live in the southern third of the country where they are farmers and cattle raisers. Some of them continue to practice ancient skills of weaving and making objects of pottery, silver, and leather. Many of them, though, take an active part in modern Chilean life.

**Freedom and Independence.** Until 1818, Chile was a Spanish colony. Two famous South American heroes led the fight for Chilean independence. One of them was José de San Martín of Argentina who previously had led the successful fight for independence in his own country. The other leader was Bernardo O'Higgins, a native



Chilean whose father had come from Ireland. Young O'Higgins was sent to England and Spain for his education. While there he met other young men who were plotting to overthrow Spanish rule in South America. After returning home, O'Higgins and other patriots of Chile worked for independence. The revolutionists were defeated in their first battle with Spanish troops in 1814. O'Higgins and many of the men crossed the Andes to join José de San Martín in Argentina, where they organized an army. In 1817, they marched across the Andes into Chile. For eighteen days they struggled through the high mountain passes with an army of 5,000 men and 1,600 horses. Near Santiago the army quickly defeated the Spanish and took possession of the city. Battles continued for about a year, but independence was firmly established in 1818.

## QUESTION BOX

9

1. What are the main land features of Chile?
2. Why do few people live in northern Chile?
3. What is alluvial soil?
4. What is a Mediterranean climate?
5. What is the land like in southern Chile?
6. How do most of the people who live near the Strait of Magellan make their living?
7. Where on the Earth are there mountains higher than the Andes?
8. What is the highest peak in the Andes? Where is it located?
9. What Indian tribe was living in Chile when the first Spanish explorers arrived?
10. What two men were largely responsible for achieving the independence of Chile?



About 352,000 Chileans were left homeless after a series of earthquakes in 1960.

**Earthquakes.** Along the western coasts of South America and North America, earthquakes frequently occur. Chile has many of them. In 1960, several very serious earthquakes killed more than 6,000 Chileans and caused damage of about one-half billion dollars.

For many years, scientists have been studying earthquakes in an attempt to learn how to predict them. About all that can be done at present is to indicate areas where they may be expected at any time. Scientists believe that earthquakes are caused by the sudden shifting of rock along faults in the Earth. A fault is a crack or break in the Earth's crust which may be compared to a bone fracture. Great pressure, perhaps due to the weight of mountains near the ocean, builds up on rocks under the Earth's surface. When the rock can stand the pressure no longer, it slides or slips along a fault, causing a quaking in the earth and sometimes causing land areas to rise or fall. During the quake in Chile in 1960, for instance, large areas of land along the coast were flooded because they were lowered several feet during the series of quakes. Because of earthquakes, many cities in Chile are more modern than they might otherwise be. Concepción, for instance, has been rebuilt several times.





Buildings such as this one were constructed in Concepción after a severe earthquake in 1939.

**Mineral Wealth.** Chile has great mineral wealth. The two most valuable minerals are copper and nitrates. Other important minerals are tin, sulfur, iron ore, coal, petroleum, manganese, lead, zinc, gold, and silver.

Chile is one of the world's leading producers of copper. The mines have been worked for centuries. Many small copper mines are still worked in Chile, but the greatest amount of ore comes from three large mines. Copper mining is important to Chile because about three-fourths of the income from exports comes from copper.

The largest and best-known copper mine in Chile is Chuquicamata. It is located in northern Chile at an altitude of 10,000 feet between the Atacama Desert and

Houses such as these typify Chuquicamata's modernization program. Water is piped many miles across the desert to this "oasis town."



the western ranges of the Andes. This deposit of copper ore is one of the largest in the world. The ore is carried by railroad to the port of Antofagasta. A second large mine is at Potrerillos, at about  $26^{\circ} 30'$  South and  $69^{\circ} 30'$  West. The third large mine is named El Teniente. It is located about 70 miles southeast of Santiago. Chuquicamata is one of the world's largest open pit mines, and El Teniente is one of the world's greatest underground or shaft mines. Recently, these three mines were modernized by mining companies from the United States. Millions of dollars were spent to develop efficient mining operations. Machinery, railroads, power plants, and smelters all had to be built. In addition, homes, schools, recreation centers, theaters, and playgrounds were built for the workers and their families.

For plants to grow well, water and sunshine are necessary. In addition, three substances are needed in the soil—nitrate, potash, and phosphate. Chile is the only country in the world where sodium nitrate is found in large quantities. For many years, Chile's deposits of nitrate were the only good source of this mineral. At that time, the deposits were very valuable. More than one-third of the money needed by the government was obtained from taxes on the nitrate.

Nitrate not only is valuable as fertilizer, but also is used in making explosives. During World War I, ways of making nitrate synthetically were invented. After the war, many countries started making nitrate because it could be made more cheaply than they could buy it from Chile. Even though better mining methods have lowered the cost of natural nitrate, there is now much less demand for it.

The main nitrate deposits in Chile are located in the northern desert area. To mine the nitrate, drills are used to sink shafts into the hard rock. Explosives are





*Top left.* Diamond core drills were used by geologists in discovering a major copper deposit, called El Salvador, 20 miles from Potrerillos. *Top right.* Chuquicamata, a huge open pit mine two miles long, yields close to 140,000 tons of ore and waste daily. A ton of this ore contains about 40 pounds of recoverable copper. *Left.* A shaft mine near Santiago, with a newly built concentrator nearby.



*Above.* In buildings at right, crude ore is crushed, broken into small pieces, and made into concentrates. *Right.* The interior of one of the buildings in which concentrates are made. Inside the large red cylinders are iron balls that crush the ore.







*Left.* At an *oficina*, or Chilean nitrate mine, open pit methods are mostly used. This crew is drilling shafts 8 to 10 feet deep into which dynamite will be placed for blasting. *Right.* Refined nitrate is loaded in bulk form.

placed in these shafts. When the blast is set off, the nitrate rock is blown into many small pieces. It is then loaded onto cars and taken to a crushing mill. After being crushed, the ore is placed in huge vats of water where the nitrate separates from other minerals. Then the water is allowed to evaporate, leaving the nitrate. After being dried, the nitrate is placed into bags for shipment. More than a million tons of nitrate are exported from Chile each year, although this amount represents only about one-twentieth of the world's production. Iodine and potash are also obtained as by-products of the refining process. Most of the world's supply of iodine comes from Chile.

Both coal and iron ore are mined in Chile. Two mills, one at Valdivia using hydroelectric power, and one near Concepción using coal, manufacture iron and steel. Enough steel is now produced that some of it can be exported to nearby countries. Chile is one of the few South American countries with considerable coal deposits. The coal is mined near Concepción in shafts which extend under the sea. Because the coal is not good for coking, it has to be mixed with imported coal to make coke, which is used in smelting the iron ore.

Extensive petroleum fields have been

found on Tierra del Fuego, the large island across the Strait of Magellan from mainland South America. Although Chile does not yet produce quite enough petroleum for its needs, production is growing. Chile also has vast reserves of sulfur. Several companies produce it for use within the country and for export.

**Manufacturing in Chile.** Coal, water power, and petroleum are resources which have aided the development of manufacturing in Chile. Most manufacturing plants are located in Santiago, Valparaíso, Concepción, and Valdivia. Industries now supply most of the country's need for textiles, iron and steel products, cement, leather goods, glass, paper, furniture, and tires. The largest single industry is food processing. Manufacturing is growing rapidly in Chile, and probably will continue to do so.

**Agriculture.** Because of Chile's latitudinal length, a wide variety of agricultural products can be raised. **Semi-tropical** or "almost tropical" products are grown in the north. Products which do well in cool climates with cold winters are grown in the south. In both the northern and central parts of the country, irrigation is necessary for crops to grow well.

Only about four-tenths of the land of Chile is productively used; the rest of the

land is mountainous, covered with glaciers, or desert. About half of the productive land is forested, and about a fourth of it is in pasture for grazing. Thus, only about one-fourth of the productive land, or one-tenth of the total land area, is used for crops. Some food has to be imported.

Wheat, rice, corn, barley, and oats are major crops. Peas, beans, lentils, and potatoes are also important food crops. Considerable acreage is devoted to plants with oil-bearing seeds, such as sunflowers and flax. Citrus fruits, grapes, apricots, peaches, plums, apples, and pears are leading fruit crops. Nuts and olives are also grown. Cotton is not grown in Chile, but some plants which are used in making textiles, such as hemp and flax, are cultivated.

In mountain meadows and throughout the southern part of Chile, many sheep and cattle are grazed. In the central valley, where corn is raised, large numbers of pigs are fattened for market. Goats are raised in the drier northern section of Chile. Farmers are keeping more dairy cattle and fewer beef cattle. The number of livestock on Chilean farms has not increased in recent years, however.

On the island of Tierra del Fuego and in other regions of the far south, large numbers of sheep are raised. The cold, moist winters encourage the growth of fine wool on the sheep. Considerable amounts of wool and sheepskins are exported. Punta Arenas, the largest city in the far south, is the port through which much of the wool is exported.

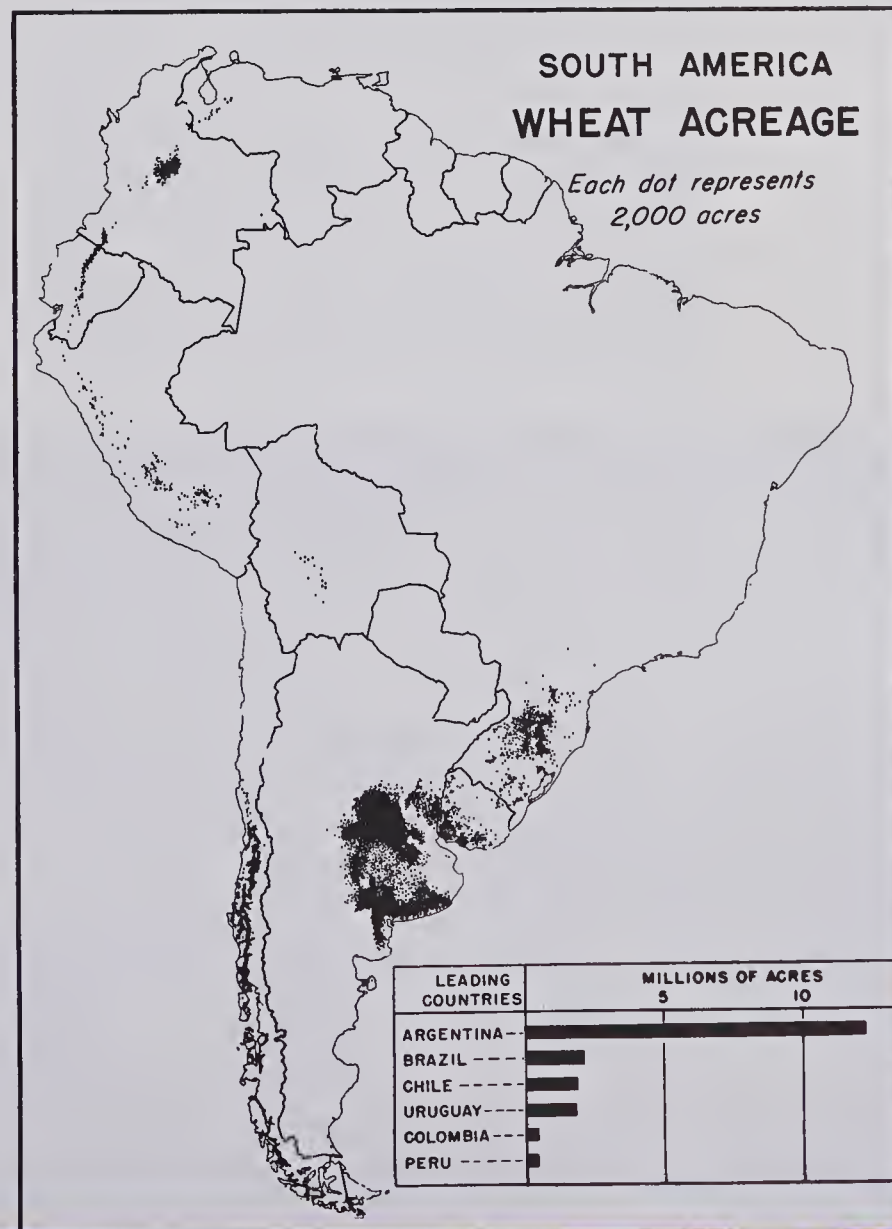
**Forestry and Fisheries.** Most of the forests of Chile are found in the southern third of the country. Forests which once covered much of the land in the central valley have been cleared so that the land could be used for farming. Much good timber was wasted in the process.

For many years, lack of good roads into forested areas hindered effective use of the

timber. Recently, roads have been improved, and enough lumber for the country's needs now is being produced. Young trees are planted each year to replace those which are cut. The main center for paper and pulp production is Concepción, but small paper and pulp mills are located at Santiago and Valdivia. At Valdivia, charcoal for use in smelting iron is produced from the wood.

The Peru Current brings to the Chilean shores many fish and shellfish. As a result, fishing is a major industry, employing thousands of men on small fishing vessels and many more in about 60 canneries. In the northern desert area, many fish are dried and salted.

The map below shows areas in South America where wheat is grown. Each dot on the map represents 2,000 acres planted in wheat. Why can more wheat be grown in southeastern Brazil than in the Amazon Basin? Can you name the wheat-growing region in Chile?






## QUESTION BOX

10

1. Why do earthquakes occur?
2. How have earthquakes helped modernize Chilean cities?
3. What are the two main mineral exports of Chile? Where are the major deposits of these two minerals?
4. What are some uses of nitrate?
5. What advantage, which permits the development of a steel industry, does Chile have over most other South American countries?
6. What other sources of power does Chile have?
7. What is the largest industry in Chile? What other products are manufactured?
8. About how much of Chile's land is productively used?
9. What are the main crops raised by Chilean farmers?
10. Of what value is the Peru Current to the Chilean people?

**Transportation in Chile.** Because of Chile's long coastline and the high Andes to the east, most of the country's products are moved by water. Most ores extracted in Chile are exported from coastal ports.

Railroads have been built through Chile



This portion of the Pan American Highway is an all-weather road. A roadbed of crushed rock usually stands up well in heavy rains.

from Iquique in the north to Puerto Montt in the south. Branch lines extend to the coast and toward the Andes in a number of places. Some Chilean railroads are operated by the government; others, by private companies. Unfortunately, the rail lines are of different **gauges**. Gauge means the distance between the rails. A **standard-gauge** railroad has tracks which are four feet, eight and one-half inches apart. Products being moved from one section of Chile to another, therefore, sometimes must be changed from train to train.

Railroads cross the Andes in four places; two lines extend into Bolivia, and two into Argentina. The three crossings in the north are used largely to move ores to coastal ports. The most famous railroad crosses



Sightseers get a good view of Valparaíso's harbor from this terrace. *Below.* The statue, Christ of the Andes, a symbol of peace, stands on the Chilean-Argentine border high in the Andes Mountains.





the Andes east of Valparaíso, and is the transcontinental route to Buenos Aires. A tunnel two miles long on this line cuts through the highest mountains. This railroad is kept open most of the winter, but occasionally it is closed for a few days by heavy snows.

The Pan American Highway has been built through Chile from the northern border with Peru to Santiago. It extends eastward, paralleling the railroad, into Argentina. The road goes over Uspallata Pass at an altitude of 12,800 feet. This pass frequently is blocked with snow, and usually is closed from May through December. During those months, however, cars can be shipped by rail through the long tunnel so that motorists can continue their journeys. Most of the Pan American Highway in Chile is not paved, but it is a good all-weather road.

About 30 Chilean cities have air service and good airports. Five of the cities—Santiago, Puerto Montt, Punta Arenas, Antofagasta, and Arica—have international airports where people from other countries may enter Chile by airplane.

**Two Leading Cities.** Santiago, the capital of Chile, is located in the central valley. It is the largest city in the country, and is a busy manufacturing and commercial center. An interesting feature of Santiago is a high hill near the center of the city. Years ago, during their wars with the Araucanians, the Spanish fortified this hill and used it as their headquarters. The hill now is a park where visitors can get a fine view of the city. Santiago is noted for its many beautiful and modern buildings. A parkway named Avenida Bernardo O'Higgins extends through the city.

Valparaíso is Chile's leading seaport. It was founded over 400 years ago by a Spaniard who gave it the name which means *Vale of Paradise*. A man-made breakwater in the Valparaíso harbor protects ships

from storms. A flat area, from a few hundred feet to half a mile in width, borders the bay. Back of this flatland are steep hills, with homes built on terraces. Most of the business buildings in Valparaíso are on the lower level around the bay. Elevators and little cable cars running on steep, inclined railways carry people from one level to another. Winding roads and walks also lead up and down throughout the city.

**Government and Education.** Chile is a republic, with a president elected by the people for a period of six years. The two legislative bodies are a Chamber of Deputies and a Senate. As in the United States, a Supreme Court operates as the highest court of justice. The constitution of Chile guarantees freedom of thought and religion, and the separation of church and state. Both men and women may vote, but members of the armed forces, priests, and ministers may not. The provinces of Chile are under the direct control of the central government. In this respect, they are unlike the states in the United States and provinces in Canada which have their own governments.

According to law, all children between seven and fifteen years of age must attend school. After six years in elementary school, students move into six-year secondary schools. There they study Spanish, mathematics, physical and natural sciences, social studies, a foreign language, art, and physical education. There also are a number of trade and industrial schools in the larger cities of Chile. About one-third of the students attend private, usually church-operated, schools. The rest of them attend public schools. Several universities in the larger cities provide opportunities for higher education.

Many children in rural areas, however, have no school to attend. About one-fifth of the adults in the country, most of whom live in rural areas, cannot read or write.



**Economic Difficulties.** In recent years, inflation has been a great problem to the government and people of Chile. A period of inflation is a time in which the cost of living rises rapidly, and the value of money therefore declines. In a recent year, the cost of living in the United States rose about one per cent while the cost of living in Chile rose 36 per cent. The government in Chile has been trying hard to hold prices at a steady level. Many new industries have been started to provide jobs for the people. When compared with standards of living in many other countries in South America, that in Chile is quite good. The new common market may help Chile in its fight to control inflation and raise the standard of living. Money from outside the common market will undoubtedly still be needed, however, if rapid progress is to be made.

#### QUESTION BOX

11

1. Where are the railroads in Chile?
2. How can automobiles cross the Andes on the Pan American Highway during winter months?
3. What Chilean cities have international airports? Locate each of these cities by latitude and longitude.
4. How has the harbor at Valparaíso been improved?
5. Who may vote in a Chilean election?
6. What is one difference between a Chilean province and a state in the United States?
7. What subjects are studied by students in a six-year secondary school in Chile?
8. What economic problem has been causing difficulty in Chile in recent years?
9. Why are most goods produced in Chile shipped by water?

#### ARGENTINA

East of Chile in southern South America is the nation of Argentina. Locate it on the map on page 56. Argentina, like Chile, is longer from north to south than it is from east to west. It is about 2,300 miles long, but is less than 1,000 miles wide at its widest point. If placed on the western United States, Argentina would reach from San Diego, California, to Juneau, Alaska. This land is about one-third the size of the United States and it has slightly more than 21 million people.

**Early History.** No one knows how long people had lived in Argentina before the first European explorers arrived. In 1516, Juan Diaz de Solis, a Spanish explorer, sailed into the broad estuary now known as Río de la Plata. He claimed the estuary and the surrounding territory for Spain. Eleven years later, Sebastian Cabot founded the first European settlement in the area. Because he saw the Indians using articles made of silver, he gave the large estuary its name meaning *river of silver*. Cabot and others who came after him sailed up the estuary and up the Paraná River seeking the source of the silver. For about 50 years, settlements in El Plata, as the region was then named, struggled for survival. Most of the settlements eventually were abandoned because of food shortages or Indian massacres. In 1534, the King of Spain appointed Pedro de Mendoza commander of an expedition to found a colony. De Mendoza and his party landed where Buenos Aires now is located. One of his men traveled farther upriver and built a fort at Asunción, which is now the capital of Paraguay. Frequent attacks by Indians led the survivors at Buenos Aires to give up the settlement there and go upriver to Asunción.

During this time, Spaniards from Peru and Chile crossed into northwestern Argentina. They established settlements at



Tucumán, Santiago del Estero, Córdoba, and Mendoza. Find these cities on the map on page 56.

Not until 1580 was a permanent settlement established at Buenos Aires by a man named Don Juan de Garay. He gave the city its name which means *good breezes*. Garay realized that the wealth of this region lay not in gold and silver, but in fertile land. He knew that the Río de la Plata could be used as a gateway to rich lands in the interior. He drew up plans for a great city of four million people. Though it has not grown just as he planned it, his little settlement has become a city about that large. Buenos Aires is now the largest metropolitan area south of the equator. Almost four million people now live in Buenos Aires and almost seven million in metropolitan Buenos Aires.

**Independence for Argentina.** Argentina was one of the first South American countries to gain its independence. Misrule by governors from Spain led Argentineans in 1810 to demand a self-governing council. This demand was granted, but later the King of Spain tried to gain control of the country. In 1816, independence from Spain was declared by the Argentine people. José de San Martín led the fight for freedom in Argentina, as he later did in Chile and Peru.

For many years, the various provinces of the country could not agree on a central government. During this time, little was done to develop the country and to use its resources wisely. Finally, in 1860, a constitution was approved, and the Republic of Argentina began to progress more rapidly.

**The People of Argentina.** Although Indians lived on the land when the first European settlers arrived, very few Argentineans today are of Indian ancestry. Millions of European immigrants came to Argentina in the early years of this century. Most of



This picture shows how an artist believed Buenos Aires was founded in 1580.

them came from Spain and Italy, but some came from France and Great Britain. As was true in the United States, the immigrants brought their own ways of living to the new land. For example, Spanish, Italian, and French immigrants from wine-making regions in Europe started a wine industry in western Argentina. Welsh, Scottish, and English settlers raised sheep in hilly areas of the country. Many of the immigrants had been farmers in Europe, and found fertile land to work in Argentina. Many descendants of these immigrants work in industries in large cities.

**Major Regions.** Argentina can be divided into seven major regions. Find them on the map on page 69. These regions are named Pampa, Mesopotamia, Chaco, Northwest, Cuyo, Basin and Range, and Patagonia. As the map on page 54 shows, most of the people live in the Pampa.

The building in the center, which is called The Capitol, houses Argentina's legislature.





**The Pampa.** The Pampa is a plains area, roughly equal in size to the states of Illinois, Minnesota, Iowa, and Missouri. It extends about 350 miles inland from Buenos Aires. Almost nine-tenths of the country's cultivated land, three-fourths of its industries and transportation facilities, and two-thirds of the people are located there.

Originally, the Pampa was grassland. Like the prairies in the midwestern part of the United States, these plains have very fertile soil. The region has become one of the best grain-growing and livestock-producing areas in the world.

The Pampa has five main zones of production. Near Buenos Aires, most farmers keep dairy cattle and raise vegetables and fruits for the city dwellers. Farther inland, near Rosario, corn and flax are the main crops. South of Buenos Aires, in the area surrounding Mar del Plata, are large cattle ranches where a few crops also are grown. A huge area extending southward from near Rosario to the coast is used for raising wheat and cattle. Large crops of alfalfa, which is used in feeding the cattle, are grown in the western and southern portions of the Pampa.

**Mesopotamia.** Mesopotamia means *land between the rivers*. It is located northeast of Rosario between the Río Uruguay and the Río Paraná. For many years, this portion of Argentina was almost uninhabited because it was so swampy, but today most of the land is used for agriculture. Rice is the main crop grown in Mesopotamia; bananas, citrus fruits, manioc, and tobacco are also grown. Yerba maté, a kind of tea that is very popular in Argentina and other South American countries, is grown also. Some cattle are raised, and some lumber is produced.

**Chaco.** Much of northern Argentina, as the map shows, is part of the region known as El Gran Chaco—the great forest. The climate in the Chaco region is much warmer

than that farther south, with considerable rainfall during the summers and dry winters. Where the land has not been cleared for farming, it is covered with small trees and bushes. For many years the Chaco area has been the source of the quebracho tree, from which tannin is obtained. Many of the best trees have been cut to supply the tannin mills. Since quebracho trees grow very slowly, other faster-growing plants are being developed, and reforestation of quebracho trees is under way. Trees containing the most tannin are between 150 and 170 years old. A quebracho tree that old usually has a trunk which is about 20 inches in diameter, that is, 20 inches from one side of the tree to the other directly through the center.

Wood from these trees is used in numerous ways, but the most valuable product is tannin. Tannin extract is used in making leather from hides. Because the bark of the quebracho tree contains little tannin, it is removed before the tree is shipped to the tannin mill. At the mill, the wood is cut into small chips about  $\frac{1}{8}$  of an inch in length. Then the chips are soaked, because tannin can be drawn out of the wood by water. The chips are soaked in six to eight large copper vessels, the first containing a very strong solution, and the last containing pure hot water. Each soaking is in a weaker solution, and gradually all of the tannin is drawn out of the wood chips. Because so much water is needed to extract the tannin, these mills are near rivers.

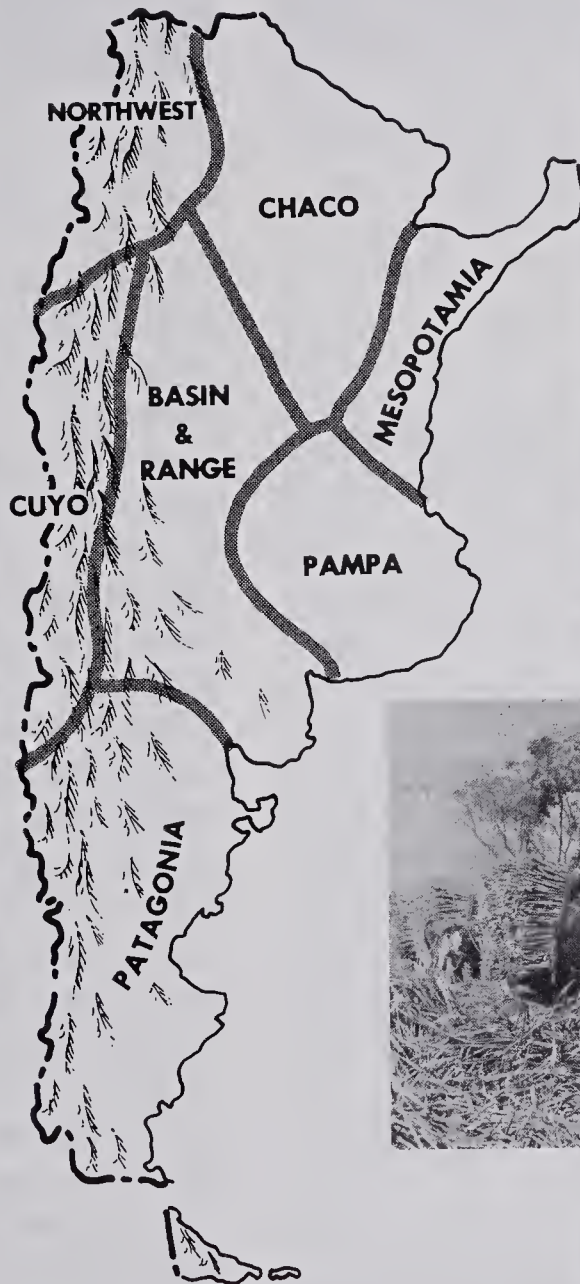
Most of the water is then removed from the tannin solution and the extract is placed in sacks. Within a few days, it dries into a hard mass. Then it is shipped to markets all over the world.

The Chaco has become even more important to Argentina because it is now a main center for cotton growing. More than enough cotton is raised in the region to meet the country's needs.





The map of Argentina is surrounded by pictures, each illustrating a particular feature of one region. Can you identify any of the regions in which these photographs were taken? (Use your text to help you in finding clues.)







Argentina is the principal sheep-raising country in South America. Large amounts of wool and mutton are exported annually.



It takes about two years for the yerba maté plant to produce leaves which are picked and roasted to make a very popular drink

### QUESTION BOX

12

1. What is the English meaning of Río de la Plata? What does Buenos Aires mean?
2. From what European country did the early explorers and settlers of Argentina come?
3. What is the ancestry of most Argentinians?
4. What are the seven major regions of Argentina?
5. In which of the regions are most of the people? Where is most of the good farmland?
6. What are the two most important products of the Pampa?
7. What is yerba maté? Where is it grown?
8. How is tannin extracted from quebracho wood?

**The Northwest.** The Northwest region includes the wooded eastern slopes of the Andes, and a high plateau extending westward and northward into Chile and Bolivia. Sugar cane is a large crop raised in irrigated valleys near Salta and Jujuy. After the juice has been pressed from the cane

for sugar, the pulpy stock is used to make paper. The largest city in the region, Tucumán, is a center for the sugar and paper industries.

In this region are a number of small tin, gold, borax, and sulfur mines. Many of these are worked by the Indians, as they have been for hundreds of years. The Indians also raise potatoes and beans near streams.

**The Cuyo.** The Cuyo region extends north and south along the eastern slopes of the Andes. Most of this region is very dry, but water from melting snow makes irrigation possible along the streams. Alfalfa is grown on the irrigated land. Extensive vineyards and olive orchards are found in valleys and on the lower slopes of the mountains. Olive trees and grapevines have long roots, and can thrive in such places without irrigation.

The main cities in the Cuyo are Mendoza and San Juan, both food-processing centers. There are oil fields near Mendoza.

**The Basin and Range Region.** Between the Cuyo and the Pampa is an area which is much like the Great Basin in the southwestern part of the United States. This region has some mountains, some desert, and some land covered with grass and



scrub forest. Very few people live in the Basin and Range region. Cattle are grazed along streams in the basins, and sheep and goats are grazed on the mountains. A number of minerals are mined, including copper, silver, gold, tungsten, and manganese.

The largest city in this region and Argentina's third-largest city is Córdoba. It is located at the edge of the Pampa where hydroelectric power can be produced and where mountain breezes provide a cool climate. Industries are growing rapidly in Córdoba. It is now a center for the production of chemicals, shoes, leather goods, tobacco products, and automobiles.

**Patagonia.** The southern third of Argentina is known as Patagonia. Early explorers, after noticing the large footprints of the Indians who lived in the region, gave the Indians this name which means *big feet*. Patagonia is the least developed of the regions of Argentina. Wide variations in climate from place to place are caused mainly by the extent of exposure to wind. The Andes in western Patagonia are much lower than they are farther north, seldom reaching 14,000 feet in altitude. Nevertheless, there are many snowfields and glaciers which make the mountainous part of Patagonia one of the most beautiful regions in the Western Hemisphere.

Almost all the land of Patagonia, east of the Andes, is a desert. Where streams flow across the plateau, valleys are irrigated for farming. Much of the area is used for sheep grazing. Oil fields have been developed near Comodoro Rivadavia, and coal is mined at Río Turbio. A railroad has been built from Río Gallegos westward to Río Turbio so that the coal may be transported for use elsewhere. There is no other railroad farther south. Very few people live in Patagonia. In each of the port cities, there are packing plants to process agricultural products brought to the ports from the interior.

**Climate.** As has been indicated in describing the regions, Argentina has a wide range of climates. Northern Argentina extends into low latitudes north of the Tropic of Capricorn. Except at high altitudes, that area has warm weather constantly. By contrast, southern Argentina, extending southward to Tierra del Fuego, has much cold, windy weather and considerable snow during winter months.

In general, rainfall increases toward the Atlantic Coast and decreases toward the west. On the rich, fertile Pampa, some rain usually falls all during the year and temperatures are consistently mild. Pastures therefore remain green all year long.

**Agriculture.** Of the available land in Argentina, about four out of ten acres are used as pastures. About three out of ten acres are covered with scrub forests, and about one out of ten is planted in cultivated crops. The remainder of the land, about two acres out of ten, is mountainous or desert land.

Argentina is one of the great agricultural countries on the Earth. Farmers own almost 45 million beef and dairy cattle, and about the same number of sheep. Farmers living in corn-producing areas of the country raise about 3½ million hogs each year. Most years, more meat and grain are produced than is needed in Argentina, so these products are exported to other countries. Much of the meat and grain goes to western Europe, especially to Great Britain and West Germany. Much wool goes to the United States. Other countries in South America, of course, also import agricultural products from Argentina. About one-fourth of the world's supply of meat and one-tenth of the world's supply of wool are produced in Argentina.

The largest crop raised for export is wheat, although some oats, barley, and rye are also grown for export. In many sections of Argentina, farmers plant two crops a





*Top.* Buyers from meat-packing plants examine beef cattle in this Buenos Aires stockyard. *Center.* After the cattle are killed and dressed, sides of beef are placed in refrigerated rooms. *Bottom.* A large meat-packing and cold storage plant. Note its location by a navigable river.



year on the land. More acres are planted in alfalfa than in any other single crop. Most of it is fed to beef and dairy cattle.

In recent years, oil-bearing seeds have become increasingly important as an agricultural product. Argentina exports more flax seed, from which linseed oil is made, than any other country in the world. Oil is also obtained from sunflower seeds and from peanuts. As cotton production has grown, so also has cottonseed oil production. Much less money is received, however, from the sale of vegetable oils than from the sale of meat, wool, and hides.

For many years cattle were raised in Argentina primarily for their hides, which are used in making leather and for **tallow**. Tallow is animal fat which is used in making soap and candles. At that time, salting and drying were the only ways of preserving meat. After refrigerated ships came into use, however, European markets for frozen meat expanded rapidly. When Argentine stock raisers discovered how large the markets were, they began to import fine breeds of animals. They fenced their large ranches, which are called **estancias**, and began raising alfalfa and other feed crops. Today Argentine herds are world famous, and meat packing is Argentina's biggest industry.

Cattle can be raised more cheaply in Argentina than in the midwestern U.S.A. Costs are low because pastures may be grazed all year, and little or no shelter is necessary during winter months. Also, farmers have low transportation costs because the main farming area is fairly close to shipping ports. Even so, in recent years, cattle production has fallen rapidly because of government regulations and inflation. Recently, the government ordered beefless days every Monday and Tuesday so that exports could remain high. About 90 per cent of Argentina's income from trade comes from agricultural exports.





The map at the left shows where sheep are raised in South America. Cattle-raising areas in South America are shown at the right. Note the large area in Brazil where few cattle or sheep are raised. Can you tell why? (Look at the map of South America on page 53. Note what covers most of the land in the Amazon Basin.) Are more cattle or sheep raised in lands north of the equator or in lands south of the equator in South America?



### QUESTION BOX

13

1. How is the pulp used which is left from the stalks of sugar cane?
2. What crops are grown in the Cuyo region? Why?
3. Why is Córdoba a rapidly-growing industrial city?
4. How is most of the land in Patagonia used? What important mineral fuels are found in Patagonia?
5. Why does Argentina have a wide range of climates?
6. What are the main exports of Argentina? What countries import these products?
7. What crop recently has grown in importance in Argentina?
8. What invention stimulated Argentine farmers to develop beef of better quality?
9. Why can Argentine ranchers produce and export beef at lower prices than the ranchers in the prairie states of the United States?

**Manufacturing and Mining.** Until World War II, most manufacturing in Argentina was related to food processing. Argentina still produces and processes sufficient food for its people, except for tea, coffee, cocoa, spices, and tropical fruits. Important industries based on agricultural products, in addition to meat packing, include flour milling, sugar refining, and making wine. Tobacco and dairy products are also made.

In recent years, other manufacturing industries have been growing rapidly. Some of these, such as leather goods and textiles, are based upon agricultural products of the country. Others, including rubber goods, iron and steel, machinery, and automobiles are based wholly or largely upon imported raw materials. About half the wealth of the country now comes from manufacturing industries, while agriculture accounts for only about two-fifths of it.

Argentina lacks good supplies of coal and iron ore. The only good source of coal, at present, is at Río Turbio in the far south, and that coal is not good for coking. To overcome the lack of power fuels, the





To find a productive oil field, often many test wells such as this one must be drilled.

country is rapidly building hydroelectric power plants and developing its oil fields. Even so, much coal has to be imported.

The only minerals which are mined in important quantities are lead and zinc. Some sulfur, tungsten, and beryllium are also produced, and a little iron ore is mined near Jujuy. Nickel, uranium, copper, gold, and mica also are obtained.

For a long time the Argentine government refused to permit companies from other lands to explore for petroleum in Argentina. As a result, little progress was made in expanding petroleum production. Then, beginning in 1955, the government allowed oil companies from Great Britain,

the Netherlands, and the United States to search for oil. Large reserves were found, and about \$500 million was spent by the firms to develop the fields. In 1963, the Argentine government seized all the properties of the oil companies.

**Transportation.** Argentina has an extensive railroad network which was built primarily with British aid. The railroads are owned by the government. Most of the lines fan out from Buenos Aires to all areas of the Pampa. No railroad line extends completely across the country from north to south. Transcontinental lines extend westward into Chile and Bolivia.

The Pan American Highway, as the map on page 52 shows, extends eastward to Buenos Aires from the Uspallata Pass in the Andes. Branches extend northward to Rio de Janeiro, Asunción, and La Paz. About one-third of the highways in Argentina are paved or have been improved. Because the number of automobiles in the country is growing very rapidly, the highway system undoubtedly will be improved greatly in the next few years.

The Río de la Plata and the Río Paraná provide a good waterway far into the country. These rivers are used to move bulk cargo to and from inland areas. Buenos Aires, located on the large estuary, has become a major port city. It handles



View of ocean-going ships taking on cargo in the harbor at Buenos Aires. Much cargo is carried to the port by small river boats such as those that are shown in the picture below.





more foreign trade than any seaport in the Western Hemisphere except New York City. Rosario, the second city in size, also has become a major port for traffic to the interior. Its docks, like those in Buenos Aires, have modern equipment for loading and unloading vessels.

Many cities in Argentina have airports. The main international airport, named Ezeiza, is located about 30 miles from downtown Buenos Aires.

**Government.** The government of Argentina has changed a number of times in recent years. The Republic of Argentina is a federal union of 22 provinces and one territory. The territory includes the eastern part of Tierra del Fuego and other islands in the far south. The constitution calls for a president to be elected by the people for a six-year term. Military men seized the government in 1962, however, after an election. In 1963, another election was held and a president was selected by the people. Laws are made by two houses of Congress — the House of Deputies and the Senate. Members of the Congress are also elected by the people for six-year terms. As in the United States, the judicial system is headed by the Supreme Court.

**Education and Sports.** Public schools in Argentina provide free education for all children between five and fourteen years of age. Almost all children are in school. Students in most secondary schools pay tuition if they can afford it, but they may attend school free if they cannot afford the tuition. About nine out of ten Argentine citizens can read and write. Most of those who cannot read and write live in remote areas of the country.

Argentineans are very interested in sports. Soccer and horse racing probably are the most popular sports. Thousands of people turn out to watch important games. The game that they call "football," we call "soccer." Basketball is growing in



Action is fast and hard in this polo match between Argentina and the United States.

popularity, too. Bicycle racing, polo, swimming, and automobile racing are enjoyed by many fans.

## QUESTION BOX

14

1. What foods have to be imported to Argentina?
2. What minerals are found in important quantities in Argentina?
3. For what industries must Argentina import raw materials?
4. How is Argentina overcoming its lack of power fuels?
5. What country helped Argentina build its railroads? Why do you think that country was interested in helping develop a good transportation network in Argentina?
6. Why is it likely that the highways in Argentina will be improved rapidly?
7. What estuary and river provide a good waterway into the interior of Argentina? What important cities are on this waterway?
8. How many provinces are there in the Republic of Argentina? How many territories?
9. What, probably, are the favorite sports of the Argentine people?



## URUGUAY

Uruguay is the smallest republic in South America, yet is one of the most prosperous. The country's wealth does not come from minerals or from manufacturing, nor does it come primarily from cultivated crops. Most of the land is used to raise sheep and cattle—in fact, livestock outnumber people by about twelve to one!

**Early History.** Notice on the map on page 56 that Uruguay has Argentina as a neighboring country. The first permanent settlement in Uruguay was made by the Portuguese at Colonia in 1680. Colonia is on the Río de la Plata across from Buenos Aires. As we have learned, in the 17th century the Spanish occupied Argentina and the Portuguese occupied Brazil. These two countries, during the 17th and 18th centuries, struggled to gain and keep possession of the land which is now Uruguay.

Led by their national hero, José Gerónimo Artigas, the people of Uruguay began their fight for independence from Spain in 1811. Though they fought bravely for many years, Artigas and his men were defeated. They fled northward into Argentina, where they lived for two years while

regaining strength. After years of struggle, Artigas' army finally was defeated, and he was forced to give up the fight for independence.

In 1828, Uruguay finally became an independent country, but its problems were not solved. During most of the 19th century, the small nation had frequent uprisings, revolts, and wars with neighboring lands. Early in the 20th century, under the leadership of José Batlle y Ordóñez, stable democratic government was achieved. Since then, Uruguay has progressed rapidly.

**Government and Education.** Uruguay is governed by a national council of nine men, who are elected by the people. Laws are made by Parliament, which consists of a Senate and a Chamber of Deputies. Members of Parliament also are elected by the people. In recent years, Communists have taken advantage of the freedom which is enjoyed by all persons in Uruguay, and have become quite active in government. A very large Soviet embassy, much larger than in most other nations this size, has been maintained in Uruguay for a number of years.

The government in Uruguay owns and operates many businesses, including railroads, the meat industry, banks, and insurance companies. Petroleum refineries, cement plants, fisheries, electric-power facilities, and the telephone system are also government owned. Workers are guaranteed a minimum wage, old-age pensions, and free medical care. They work eight hours a day, but not more than 44 hours a week, and are guaranteed vacations with pay. Such working conditions are better than those enjoyed by workers in most other countries of South America. The standard of living in Uruguay is one of the highest in Latin America.

Education is free from the kindergarten through the university. All the children

This drawing shows the raising of Uruguay's flag after a successful revolt in 1825.





This bronze statue in Montevideo honors the pioneers who crossed the plains and started Uruguay's cattle industry.



between six and twelve years of age must attend school. Although most people in Uruguay belong to the Catholic Church, there is separation between church and state. Many of the secondary schools in Uruguay are operated by church groups, and tuition usually is charged at such schools. All students, including those from other lands, may attend universities in Uruguay without paying tuition, however. Most people in the country now can read and write.

Almost all Uruguayans have ancestors who came from Europe, mostly from Spain and Italy. As in the United States, there was a great period of immigration in Uruguay. About 650,000 immigrants entered this little land between 1836 and 1926. Almost one-half of the people now live in the capital city, Montevideo.

**The Land.** Most of the land in Uruguay is a rolling or hilly plain. In the southern two-thirds of the country are low, rounded hills and valleys through which small rivers flow. The northern third of the country is slightly more rugged, although the hills there are less than 2,000 feet in altitude. Almost all the land is, or once was, grassland. About 35 million acres still are natural grassland.

The soils of Uruguay are not as deep or as fertile as those in the Argentine Pampa. For about 100 years, farmers have grazed cattle and sheep on this land, but have added little fertilizer to the soil. As a result, two of the necessary ingredients for good plant growth, nitrogen and phosphate, are now somewhat lacking. In years to come, both ingredients will have to be added if the pastures are to be maintained.

This modern building houses the School of Engineering in Montevideo. The school is a part of the University of the Republic, which has about 5,000 students. Students from many countries in South America attend Uruguay's universities. Neither foreign nor native-born students need pay tuition at Uruguay's schools and colleges.





**Climate.** Because of its location, Uruguay has a fairly mild and even climate. Rainfall varies from year to year, but it averages about 40 inches annually. Moreover, rainfall is quite evenly distributed throughout the year, although droughts and floods occasionally occur. Temperatures usually range between 50° and 72°, but are apt to change very rapidly, especially during winter months. The coldest winter month has an average temperature of 50°, and the warmest summer month an average of 72°. In the northwest, summer days are quite hot but nights are cool. Nearer the coast, many days are cloudy and humidity is high most of the year. Snow is practically unknown in Uruguay, and there are very few frosts. Strong winds frequently blow from the southwest.

#### QUESTION BOX

15

1. What is the chief source of Uruguay's wealth?
2. What two European countries struggled for many years to control the land of Uruguay?
3. How is Uruguay governed? By whom are laws made?
4. What country has a very large embassy staff in Uruguay?
5. What businesses in Uruguay are owned and operated by the government?
6. In what ways are working conditions in Uruguay better than those in many other South American countries?
7. What is the ancestry of most Uruguayans? To what church do most of them belong?
8. What is the land like in Uruguay?
9. What will have to be done if good pastures are to be maintained?
10. In what ways is the climate of Uruguay favorable for agriculture?

**Cultivated Crops.** In recent years, the government has been encouraging farmers to place more of their land under cultivation. Today, cultivated crops are raised mainly in the southwestern portion of the country. Some citrus fruits and sugar cane are raised in the far north. The principal crops of wheat, flax, fruits, and vegetables are raised along the Río Negro in the west and along the southern coast. Enough rice is now raised to supply the country's needs. Other grains produced include oats, barley, and corn which is grown for feed. In addition to flax, sunflowers and peanuts are raised commercially for their oil-bearing seeds. Sugar cane does not do well in Uruguay because the winters are too cool. Although sugar beet production is growing, much sugar still has to be imported. Some tobacco is raised, but not nearly enough to supply the demand for it.

Grapes raised in the southern part of Uruguay are used primarily to make wine. Many farmers keep bees, and gather and sell the honey which the bees make. The only crop which is exported in quantity is wheat. Each year, Uruguay exports wheat and also flour which is made from it. To enrich the soil, many more farmers are planting nitrogen-fixing plants such as alfalfa, beans, and peas. These plants help

The roundish clumps on these roots are nodules containing nitrogen-fixing bacteria.







Large herds of sheep graze on Uruguay's grassy plains. They need no shelter and can graze all during the mild winters.

improve the fertility of the soil. Do you remember why? Bacteria contained in the roots of these plants take nitrogen from the air and convert it into nitrogen compounds in the soil. Increased use of scientific methods of agriculture in Uruguay will improve crop yields and will raise the farmers' standard of living. Farming is already highly mechanized; tractors and other farm equipment are commonly used.

**Livestock Raising and Related Industries.** Throughout most of Uruguay's history, its grassland has been used as pastures for livestock. Originally, much of the pastureland lay within large estancias. At that

time, more cattle than sheep were raised. The cattle were raised mainly for their hides. Can you guess why?

Now, many of the large estates have been divided into smaller farms. As markets for meat improved in Europe, stock raisers in Uruguay improved their livestock, just as ranchers did in Argentina. Barbed-wire fences were erected to separate the ranges, and meat-packing industries developed. Today, meat and hides are important exports, going mainly to Great Britain and the United States.

At present, there are about three times as many sheep as cattle in Uruguay. Some

Wool is packed in bales for shipment. Each of these bales being loaded onto a ship in Montevideo weighs about one thousand pounds.







Why is it easier to build roads in Uruguay than in many other areas of South America?

hogs and poultry are also raised, but they are not nearly so important to the country's economy. Wool is now Uruguay's main export. About one-half of the national income depends on the export of wool. A drop in wool prices on the world market affects the people of Uruguay. Much of the wool is exported to the Netherlands, the United States, and the Soviet Union. Other European countries and Communist China also import some of it.

Several of Uruguay's most important industries are related to livestock. A growing dairy industry, for instance, produces cheese and pasteurized milk. The meat-packing industry, in addition to preparing meats, tans hides, and packs lard. Leather, leather goods, and woolen textiles are also important industries.

**Other Kinds of Manufacturing.** Because Uruguay has very limited mineral resources, almost all manufacturing is related to agriculture. Food products, such as flour, cheese, wines, fruits, and vegetables are processed for use by the people of Uruguay. Paper and paper articles, bottles and glassware, furniture, soap, candy, cigarettes, and clothing are also made.

Uruguay must import many manufactured articles. In recent years, the value of exported agricultural products has not equaled the cost of imported manufactured articles. As a result, the country has had economic difficulties and inflation.

**Transportation.** The map on page 56 shows that the Río de la Plata and the Uruguay River are important waterways for this small nation. The Uruguay River is navigable as far north as Salto. Small boats can also go up the Río Negro as far as the dam which has been built near the center of the country. This dam forms a large lake and makes possible the production of hydroelectric power. Ferries connect Colonia and Buenos Aires, and ships provide daily service between Montevideo and Buenos Aires. Fray Bentos, Paysandú, and Salto all are important river ports. Fray Bentos has many meat-packing plants, and Paysandú has flour mills, sawmills, creameries, and canneries. Salto, the second largest city of Uruguay, is a center for

Hair is scraped from hides at a tannery. Horns are removed from cattle so they will not injure each other. A "yerba maté break" in Uruguay.







Montevideo is called the "City of Beaches." From November to March, which are the summer months in Uruguay, vacationers from many countries enjoy these beaches.

processing citrus fruit, meat, and other agricultural products.

Uruguay's railroad system is quite extensive. It was built by British companies and owned by them until after World War II. It is now owned by the Uruguayan government. Railroad lines fan out in several directions from Montevideo. The network reaches all the important cities.

Uruguay's system of roads ranks among the best in South America. Highways are being improved rapidly, but few hard-surfaced roads have been constructed. Many buses and trucks are used in the country, and new roads are badly needed. The Pan American Highway connects Colonia and Montevideo, and then runs northeast through Minas, Treinta y Tres, and Melo to the Brazilian border.

Most of the larger cities have airports. International flights use the Carrasco airport at Montevideo, and several major airlines have frequent flights to Montevideo.

**Recreation.** The people of Uruguay like to play as well as work. Beautiful beaches all along the coast are enjoyed by swimmers and sun bathers. Sailing, rowing, fishing, and other aquatic sports are favorites of the people. During the summer months, many stores and offices are open only half a day to give the people time for fun. Tennis, polo, basketball, and soccer (called

"football") are enjoyed by many people. Thousands of people turn out to watch soccer matches when teams from other countries come to Montevideo to play.

## QUESTION BOX

16

1. What happened in Uruguay when markets for meat improved in Europe?
2. What is Uruguay's main export today? To what countries is it exported?
3. What industries related to livestock have developed?
4. In which part of Uruguay are most cultivated crops raised?
5. What are the main crops raised? What crop is exported in quantity?
6. What crops are grown to improve the fertility of the soil? By what process do the plants do this?
7. What products are manufactured in Uruguay?
8. Why has Uruguay had economic difficulties in recent years?
9. What are the main port cities of Uruguay? On what rivers are they located?
10. What sports are very popular in Uruguay?



# NATIVE INDIAN COUNTRIES

## PARAGUAY

Paraguay is an inland country, as the map on this page shows. Paraguay's only natural outlet to the sea is the Paraná River which flows southward through Argentina to the Río de la Plata. The Paraguay River, which empties into the Paraná, divides the country into two major parts. Eastern Paraguay, where more than nine-tenths of the people live, has a humid, sub-tropical climate much like that of Florida. Western Paraguay, by contrast, is part of El Gran Chaco.

Of the nations in the Western Hemisphere, Paraguay is one of the least developed. Only a small part of the cultivable land is farmed. There are few railroads

and few improved highways. The volume of Paraguay's foreign trade is less than that of any other South American republic. There are few cities in Paraguay, and only Asunción, the capital, is fairly large. Most of the people are poor and, in rural areas, live in huts with few, if any, modern conveniences. The government and individual citizens lack the money needed to improve living conditions and to develop the country's natural resources. Some of the reasons for these conditions may be explained by the history of the country. Others are related to Paraguay's location and lack of good transportation facilities.

**Brief History.** Until 1537, Paraguay was inhabited by a tribe of Indians called the Guaraní who were hunters, fishermen, and





farmers. In 1537, Spanish explorers looking for gold and silver traveled up the Paraná and Paraguay Rivers to found the settlement of Asunción. The Guaraní Indians lived peacefully with the early Spanish settlers. Spanish men married Guaraní women. Their children are the ancestors of the mestizos who make up most of Paraguay's population today. Only a small number of Guaraní Indians are left in Paraguay, but few people in the country are without some Guaraní ancestors. Many Paraguayans speak both Spanish and Guaraní.

The early history of Paraguay is much like that of Argentina, Chile, and Uruguay. In 1811, Paraguay achieved independence from Spain and became a republic. It was then ruled in succession by three presidents. The first two presidents did much to develop agriculture and other industry. A navy was organized, some roads and railroads were built, and a telegraph system was started.

The third president led Paraguay into war in order to gain an outlet to the sea. Between 1865 and 1870, the small country fought Argentina, Uruguay, and Brazil. Nearly half of the people of Paraguay died during this war. Most of the men were killed, leaving mostly young boys, old men, and women to continue the country's development. Conditions in Paraguay were bad for many, many years but the country gradually recovered, aided by new immigrants from Europe. In 1932, Paraguay again went to war with a neighboring country, Bolivia, over the newly-discovered oil deposits in El Gran Chaco. After three years of war, both countries were exhausted. The present boundary between the two countries is located approximately where the armies finally stopped fighting. These two disastrous wars within the past century are partly responsible for the poverty in Paraguay today.

**Eastern Paraguay.** Eastern Paraguay is an upland of rolling, forest-covered hills. The highest hill reaches an altitude of about 2,000 feet. River valleys extend downward from the uplands to the plains along the Paraguay River. In some of the low-lying river areas, the land is swampy.

Extensive forests are found in the eastern part of this region, where the rainfall is heaviest. Unfortunately, lack of good transportation makes it difficult for the people to profit from these fine forests, and few people live in the forested areas at the present time. Soils there are quite fertile, however, and may in time be used for agriculture.

Most of the country's people live in a small area in southern Paraguay. This region is triangular in shape and is bounded by the Paraguay River, the Paraná River, and the railroad which runs from Asunción to Encarnación. In this area, which is Paraguay's main agricultural region, enough rain falls during the year for crops to do well. Soils that were once quite fertile have become less productive over the years because of poor farming methods. Few farmers own the land which they farm, and most of them raise only enough for their own families. Although some progress has been made recently, it is still difficult for people who want to buy land to do so. Most of the land is owned by a few people who are not eager to sell it.

Note on the map on the left that the Tropic of Capricorn is drawn across central Paraguay. Do you remember what this line means? Southern Paraguay is close enough to low latitudes so that farmers may grow many tropical products. Bananas, pineapples, sugar cane, and citrus fruit are grown. The main food crops are mandioca which is called manioc in other South American countries, corn, sweet potatoes, rice, potatoes, and beans. Other crops include cotton, tobacco, castor beans,





*Above.* Mandioca, whose fleshy roots contain from 15 to 30 per cent starch, is a favorite food in Paraguay. *Left.* A field of young pineapples in Paraguay.

tung nuts, and coffee. Vegetable oils are obtained from cotton seeds, castor beans, and tung nuts.

One of the most interesting products of Paraguay is petitgrain oil, which is used in making perfumes. Petitgrain oil is obtained from the leaves and twigs of the bitter orange tree, which grows wild in eastern Paraguay.

**Western Paraguay.** The two main occupations in western Paraguay, as in the Argentine portion of El Gran Chaco, are raising beef cattle and harvesting quebracho timber. Do you remember what product is obtained from the quebracho timber?

Very few people live in western Paraguay. The population map on page 54 shows how many people per square mile live in this region. Most of the area is a level plain, covered with grass and scrub forests. Because of poor drainage, there are swamps along some of the rivers. Frequently, the area has long droughts which

make farming a bit hazardous, but fairly good crops can be grown about two out of four years. Known petroleum deposits in the Chaco are still undeveloped.

One reason why so few people live in western Paraguay is that rivers are not navigable and there are no good roads. A few short railroads have been built from the Paraguay River westward into the Chaco. These are private railroads built to transport the quebracho wood. At the present time, the United States is helping Paraguay build a trans-Chaco highway, which will be a section of the Pan American Highway system. Money from the United States will also be used to build a good highway to Brazil.

**Transportation Problems.** One of Paraguay's biggest problems through the years has been, and is still, transportation. The country's principal means of transporting goods is the Paraguay River. River boats which draw 12 feet of water carry goods

These logs have been hauled by ox-drawn carts to a rail line.

Much timber is now hauled by truck. A pit was dug to make it easier to load the logs.





up the Río de la Plata and the Paraná and Paraguay Rivers to Asunción. In referring to boats, the term *draw* means to sink into the water. These large river boats, therefore, require water at least 12 feet deep. Smaller boats which draw only six feet of water can sail on northward to Corumbá in Brazil. A railroad links Corumbá with São Paulo, Brazil's booming industrial city, and Santos, the nearby port. Since moving goods from Asunción to Santos is a slow and costly process, most goods are carried downstream to Buenos Aires or Montevideo. Even then, transportation costs are high. It costs about as much to ship goods from Buenos Aires to Asunción as to ship the same goods from Buenos Aires to eastern Asia.

At the present time, Paraguay's only rail link with a neighboring country begins with a railroad from Asunción to Encarnación. There, a train ferry takes railroad cars across the river to Posadas, Argentina; from there, a rail line extends southward to Buenos Aires. The rail line between Asunción and Encarnación, while important for the economy of the country, is not in very good condition. It takes about two days for freight trains to haul products the distance of 230 miles.

Roads, too, are badly needed in Paraguay, and several major highways are being constructed at present. Perhaps the most needed road is one which will link Asunción, the capital city, with the port of Paranaguá in Brazil. Brazil has agreed to permit Paraguay to use this port freely without paying import duties. A good highway already runs from Paranaguá to the border with Paraguay. When the new highway is finished in Paraguay, trucks can be used to carry freight between Asunción and Paranaguá. Another highway is being built from Concepción to Pedro Juan Caballero on the Brazilian border which has rail service from São Paulo.

Because of its location in the central part of southern South America, Asunción is an important international air capital. Six airlines have flights into Asunción. Most people traveling to and from Asunción go by air because other means of transportation are so slow.

**Industries in Paraguay.** As has been indicated, agriculture is the main way of making a living in Paraguay. Most of the manufactured products are related to agriculture. A number of factories produce canned beef and prepare cattle hides for export. Quebracho extract, petitgrain oil and other vegetable oils, yerba maté, tobacco, and cotton fibers are exported. Some hardwood lumber is also transported on the rivers to seaports on the Río de la Plata.

The development of industries in Paraguay has been slow partly because of a lack of power sources. Because coal is lacking and petroleum deposits are undeveloped, wood is used as a fuel in producing some electric power. Small deposits of iron ore of good quality have been located. No attempt has yet been made to mine it, however, because of the lack of transportation facilities. Enough limestone is dug and crushed for making cement for building purposes, but almost no other minerals are extracted in the country at present.

**New Citizens of Paraguay.** In recent years, many immigrants from Spain, Italy, Germany, and France have settled in Paraguay. Many of these people had lost their

About 90 per cent of Paraguay's import and export trade is moved by river.







The Government Palace is one of the capital buildings in Asunción.

homes in World War II, and were given land by the government of Paraguay. Although the standard of living is still low, these immigrants believe that better times are ahead.

Mennonites, who are members of a religious sect, are one group of people which has immigrated to Paraguay. The Mennonites settled in the central part of El Gran Chaco at a time when almost no one lived in that region. The Paraguayan government gave them more than 2,000 square miles of land and assured them of religious freedom and low taxes. In addition, the Mennonites, who refuse to fight in wars, were promised that they would never have to serve in the army. The Mennonites are showing others that good crops can be raised in the Chaco. As a result, other people are moving into the region.

**Government.** Paraguay is officially a republic with a president. There is only one lawmaking body, and the president has a great deal of power. When the legislature is not in session, the president may issue decrees which have the force of law. Before issuing such a decree, he consults with a council of state whose members he appoints. Such decrees must be submitted to the legislature for approval when it meets. In actual practice, however, the present government is basically a military dictatorship controlled by a small group of officers and wealthy landowners. The government



Burros, sure-footed and hardy, are commonly used as beasts of burden in Latin America.

supports the Roman Catholic Church as the state church but, as we have seen, guarantees freedom of worship to people of all religious faiths.

**Education.** Many people in Paraguay still are unable to read and write. In the cities, and in a few country districts, most of the children are now in school. In many rural areas, however, boys and girls have never had a chance to attend school. About one-third of the country's children are not receiving any formal education.

If the standard of living in Paraguay is to be raised, a number of steps must be taken. All children, and many adults, must be taught to read and write. Roads should be built to all parts of the country. Areas with fertile soil should be opened for farming, swamps need to be drained, and more land in the Chaco should be brought under irrigation. Farmers ought to be taught more modern techniques of farming. Better markets for their crops are also needed. The people must learn better health practices. Power sources need to be developed.

Most of these needs can be met only if some money is provided from outside the country. The United Nations, the United States, and several other countries, are helping Paraguay to obtain the money that it needs. If Paraguay can achieve good government and can stay at peace, it should be possible for this landlocked nation to develop a higher standard of living.



## QUESTION BOX

17

1. What are some differences between eastern and western Paraguay?
2. Why has Paraguay fought two disastrous wars in the last century?
3. What steps are being taken by the Paraguayan government to improve transportation within the country?
4. What is petitgrain oil? How is it used?
5. What are the main occupations of the people of Paraguay?
6. What are the country's main exports?
7. What is the official government structure in Paraguay? How is the country actually governed?
8. What are some problems Paraguay faces in trying to improve its standard of living?

## BOLIVIA

Like its neighbor, Paraguay, Bolivia is an inland country. At one time, the borders of Bolivia reached to the Pacific Ocean. Then, a dispute over valuable nitrate deposits in the Atacama Desert led to war, with Bolivia and Peru fighting together against Chile. Peru and Bolivia were defeated, and Chile took the land west of the Andes. Today, Bolivia has about as much land as the states of Texas and New Mexico combined. There are about three and



A statue of Simón Bolívar in Caracas, the city of the Liberator's birth.

one-third million people living in this landlocked nation.

**Early History of Bolivia.** Until the early 1500's, all of the people living in Bolivia were Indians. Most of the population still is Indian, belonging now, as then, to either the Aymará or the Quechua tribe. By the time Spanish explorers arrived, both tribes had been conquered by the Incas whose capital city was Cuzco, Peru.

The first Spanish settlements in Bolivia were started at Sucre, Oruro, and Potosí. Discovery of vast silver deposits near Potosí in the 17th century led to that city's rapid growth. At one time it was the largest city in the Western Hemisphere.

For a considerable period of time, Bolivia was ruled by the Spanish from Lima, Peru. Later it was made part of a large province ruled from Buenos Aires.

**Independence from Spain.** During the 18th century, the Indians of Bolivia several times tried to overthrow the Spanish rulers.

*Left.* Quinoa grains fall onto blankets as the wind blows the chaff away.

*Right.* Indian women weave colorful woolen cloth on handmade looms.





All of these attempts failed. In the 19th century, successful battles for independence were fought under the leadership of General Simón Bolívar and General Antonio José de Sucre. In 1825, after being defeated by General Sucre, the Spanish forces withdrew from La Paz. Independence was declared, and the country was named Bolivia in honor of General Bolívar. A constitution was drawn up, and General Sucre was chosen as the first president.

Bolivia has had unstable government ever since it achieved independence. Revolutions have occurred on an average of every eight months for the past 135 years. Partly because of such instability, the Bolivian people have a standard of living only slightly better than the Paraguayans.

**Major Regions of Bolivia.** Bolivia has three main regions, as the map on page 82 will show. The western part of the country is a highlands region. Two high ranges of the Andes, known as the Western and Eastern Cordilleras, extend across southwestern Bolivia. Peaks in these ranges reach heights of 21,000 feet. Between these ranges is a high plateau, known as the *altiplano*. *Altiplano* is a Spanish word meaning *high plain*. Most of the people of Bolivia live in this highlands region.

East of the highlands there is a region of high ridges and deep valleys. In this area, especially in the valleys of the eastern slope of the Eastern Cordillera, is some of the best farmland in Bolivia.

Almost three-fourths of the land of Bolivia is a vast plain, extending from the northwest to the southeast, called the *llanos*. *Llanos* is a Spanish word which means *flat* or *level*. The northern portion of the plain lies within the Amazon drainage basin. The southern portion is part of El Gran Chaco and the Paraná-Plata drainage basin. Except in the rain forest areas of the northwest, the soils are fertile, and the plain may become an important farming

area in the future. Only a few people live on the *llanos* of Bolivia at present.

**Living in the Highlands.** The climate in the Western Cordillera is cold and dry, so that little vegetation can grow on the mountainsides. Only a few people live in the area, most of them in irrigated valleys in the northern part of the range.

Most of the *altiplano* between the cordilleras is about 12,000 feet above sea level. The largest inland lake in South America, Lake Titicaca, is located partly in Peru and partly in Bolivia on the *altiplano*. The Desaguadero River flows southward from Lake Titicaca to Lake Poopó. As the population map on page 54 shows, the area around Lake Titicaca has quite a few people. The lake helps to make the climate milder than in other Bolivian highland areas.

Rainfall on the *altiplano* averages from 11 to 27 inches a year. More rain falls in the north near Lake Titicaca than farther south. Temperatures generally average from 45 to 48 degrees all during the year. Because of the high altitude, nights are quite cold and days seldom are warm.

Most of the people living on the *altiplano* build houses of adobe bricks with roofs of grass thatch. They use grass, bushes, and dried dung for fuel. Most of the people graze sheep and perhaps some llamas, alpacas, and burros. Main crops raised on the *altiplano* are potatoes, a hardy grain named quinoa, and barley. Because of the short growing season, the potatoes rarely grow larger than a walnut, but they are a large part of the people's diet.

**Living in the Ridge and Valley Region.** The ridge and valley region between the highlands and the eastern lowlands is a semi-tropical area, which has fairly heavy rainfall. Toward the north, where rainfall is the heaviest, the land is covered with tropical rain forests. Farther south, where less rain falls is grassland with some shrubs and scattered trees.



The river valleys in this region are quite heavily populated. Near Cochabamba, which probably is the fastest-growing city in Bolivia, there are more than 330 persons per square mile. Although subsistence agriculture is widely carried on, some commercial crops also are raised. The main crops are coffee, sugar, corn, wheat, and coca from which the pain killer, cocaine, is made. In warmer valleys at lower altitudes, bananas and cacao, from which cocoa is made, are raised. Some peanuts, sunflower seeds, tobacco, rice, and cotton also are raised as cash crops.

Old methods of farming, including the use of crude tools pulled by animals, are used by most farmers. Irrigation is practiced in most of the valleys, much as it was in the days of the Incas. Modern agriculture with commercially prepared fertilizers and modern machinery, while not unknown, is nevertheless not common. As a result, crop yields are not high. To increase production, the government is trying to improve farming methods.

In 1953, a land reform bill was passed by the congress. According to the law, farmers who did not own their land would be provided with land which had been owned by the government. The government hoped to open new areas for sugar cane, rice, and oilseed production. Some moves have been made to do this, but the lack of adequate roads and other means of transportation has slowed progress.

This fishing boat on Lake Titicaca is made from reeds that grow along the shore.



**The Eastern Lowlands.** Do you remember what the land is like in this lowlands region? The llanos may be divided into two main sections. The northern section is part of the Amazon Basin, and is drained by tributaries of that great river. Much of the northern lowlands is covered with rain forests, and has many rivers, lakes, and swamps. The few people in this area live in small villages along the streams. They collect wild rubber, cinchona bark, and Brazil nuts from the forest. They depend on hunting and fishing for much of their food, although they do some farming. Usually, they practice a kind of farming called **bush rotation**. Do you know what this term means? Farmers actually *rotate* what grows on the land. Forested land is cleared, and is then planted in crops for a few years. Then, the tropical trees and plants are allowed to grow up again for a number of years. When the same area is again cleared, the growth is burned to furnish needed minerals for the soil. The land will then be fertile enough for crops for a few years. Such practices are wasteful both of labor and topsoil.

The southern section of the llanos includes a part of El Gran Chaco. You will remember that Paraguay and Bolivia once fought for control of this land. This section lies within the Paraná-Plata Basin. During dry seasons, many streams which flow down from the mountains dry up as they move across the land. During the wet or

These Indian women are shown working at a tin mine located high in the Andes.







An aerial view of a Bolivian tin-mining camp in the altiplano. Most workable deposits of tin ore from Bolivia are found at altitudes from 11,000 to 16,000 feet above sea level. Ore is concentrated in the buildings in the foreground.

rainy season, large sections of the llanos are flooded. Cattle are raised on some of the higher, better-drained areas. The beef is flown to cities in the altiplano. Lack of cheap transportation, and the great distance from markets, makes farming fairly unprofitable in this area.

**Mineral Wealth.** From the days of Spanish rule to the present, Bolivia has depended on minerals for most of its income. For many years, the silver mined near Potosí was the major export. Then, a number of important tin deposits were found. For many years, Bolivia has produced about one-fifth of the world's supply of tin. Most of the tin mines are found in the Eastern Cordillera at altitudes above twelve thousand feet. Most of the miners are native Indians since few other people are able to work effectively at such high altitudes. The ore is sent to the Pacific Coast by rail. Some of the ore is taken by railroad to the southern tip of Lake Titicaca. Steamships then carry it to Puno, Peru, a port near the northwestern edge of the lake. At Puno the ore is again placed in railway cars and taken to the port of Mollendo. At the coastal ports, the ore is loaded onto ships and is sent mainly to Great Britain and the United States.

Other important mineral ores found in the same section of Bolivia are tungsten, lead, zinc, antimony, copper, and bismuth.

Many of these metals are found in the same ores from which tin is obtained. In recent years, the quality of tin ores has been decreasing and the cost of production, therefore, has been rising. Since about 90 per cent of Bolivia's income from exports is received from minerals, the country's economy has suffered. The United Nations and the United States have provided millions of dollars to improve mining techniques and transportation facilities.

Bolivia's future economic development probably depends more upon petroleum than upon tin and silver. Petroleum fields have been located in the southeastern part of the country. **Geologists**, or scientists who study the earth's crust, believe that petroleum deposits lie under much of eastern Bolivia. A number of oil companies are continuing to drill new wells. Production at present is enough to take care of Bolivia's needs, but only a little can be exported. Pipelines already have been built to all major cities of Bolivia. An international pipeline also has been built to provide Argentina with petroleum from southern Bolivia. Petroleum products may in time provide a major part of Bolivia's income.

A number of other minerals, including salt, asbestos, sulfur, and limestone are found in considerable quantity in Bolivia. These deposits have not yet been developed to any great extent.



**Transportation.** Development of a transportation system has been one of Bolivia's major problems. Bolivia has obtained free port and warehouse facilities through treaties with Chile, Argentina, and Brazil. Railroads have been built from the ports of Antofagasta and Arica in Chile through the Western Cordillera to the altiplano in Bolivia. Santos, Brazil, is the eastern terminal of a railroad which now extends to Santa Cruz. From there a railroad extends southward to Salta, Argentina, and on southeastward to Barranqueras, a free port Bolivia may use on the Paraná River.

The Pan American Highway extends southward across Bolivia from La Paz through Oruro to La Quiaca, Argentina. Oruro, Cochabamba, and Santa Cruz have recently been connected by a hard-topped highway, which undoubtedly will hasten the development of the southeastern portion of Bolivia. A great many more roads must be built, however, before the area will develop as it should. People of many communities still use airplanes almost exclusively to reach other communities. As a result, transportation costs are high for both individuals and industries.

**Manufacturing and Commerce.** Although little manufacturing is done in Bolivia at present, the number of industries is increasing. La Paz, the capital and largest city, is the main manufacturing center. Cochabamba, however, soon may be the



A rural school in the Bolivian highlands. Such schools sometimes have double sessions.

leading industrial city. Most of the factories in Bolivia are small. There are numerous textile and clothing mills in which fabrics are woven and knit. The nation has a glass factory, a match factory, a cement plant, and a milk-processing plant. Petroleum refineries are being built, and a number of smelters are located near the mines. Bolivia must import many products, however, including coal, iron and steel products, mining machinery, vehicles of all kinds, and some foods. As we have learned, the government is trying to improve methods of farming to increase crop yields.

**Government.** Bolivia is one of the few nations in the world with two capital cities. The official, or legal, capital is Sucre which is located near the center of the highlands region. The actual working capital, however, is La Paz, where most government offices are located. La Paz is the

La Paz, the highest capital city in the world, is 11,909 feet above sea level. Notice how the houses must be built on the steep slopes of one of the streets.





highest national capital city in the world. It is located at an altitude of about 12,000 feet in a deep valley at the eastern edge of the altiplano. The city's airport, which is located on the high plateau, is about a thousand feet higher than the city itself. Many of the streets in La Paz are quite steep.

Bolivia is a republic with an elected president and two legislative houses—the Senate, with 18 members, and the Chamber of Deputies, with 76 members. Throughout the history of Bolivia, the government actually has been controlled by a small group of Europeans and mestizos. These people live mostly in the cities and mining centers. In the past, the Indians have had little power in government. As more and more of them are educated, they undoubtedly will have more influence on the government. As you have learned, there have been many revolutions in Bolivia. A higher educational level may, in coming years, bring about more stable government.

Because of the isolation of many communities, quite a number of Bolivians have not developed a feeling of national pride. The standard of living is still very low, but per capita income has now risen to \$100 per year. Continued progress in education and government should develop both a sense of pride and higher living standards. The needed resources seem to be there.

**Education.** Until recently, about two-thirds of the adults in Bolivia could not read or write. The Bolivian government then asked the Organization of American States to help wipe out *illiteracy*, which is inability to read and write. Many libraries are being built throughout the country, and courses in reading and writing are being taught to adults in most villages.

Primary education is free in Bolivia, and all children between seven and 14 years of age must attend school. Any one under 21 years of age who is illiterate is also required to attend school.

In rural schools, young people and adults are taught much more than reading and writing. New methods of farming, how to care for animals, better health practices, and how to use modern machines all are part of the school work. In time, as the educational level of the people is raised, the standard of living probably will also improve.

### QUESTION BOX

18

1. What two countries in South America do not have a coastline?
2. What tribes of Indians lived in Bolivia at the time of the Spanish conquest?
3. In whose honor was the country of Bolivia named?
4. Why have the people of Bolivia not been able to develop a high standard of living?
5. What is the meaning of "altiplano"?
6. What are the three main regions of Bolivia? Which is the largest? In which do most of the people live?
7. What are the main crops raised in Bolivia?
8. Where in the ridge and valley region do most of the people live? What commercial crops are raised in this region?
9. What has the government done to try to improve production?
10. Why may southeastern Bolivia become a very important part of the country?
11. What minerals are Bolivia's main source of wealth at present?
12. How are the ores carried to the coast for shipment?
13. Why has transportation been a particular problem in the development of Bolivia?
14. In what way is the Organization of American States helping Bolivia?



## PERU

Peru is known as the "Land of the Incas." Long before the Spanish came to western South America, a large empire had been created by the Inca Indians. At the height of its power, the empire included most of Bolivia, Peru, and Ecuador, as well as sections of Argentina and Chile. The 25 million people of the empire were under the control of a single ruler, the Inca.

The Incas had developed a rich and quite marvelous civilization. They were skilled architects and builders, and excellent farmers and weavers. In order to raise enough food for the people, the Incas built terraces on many mountain slopes. They carried soil from places in the valleys where the land could not be cultivated up to the mountain terraces. They built irrigation ditches to bring water to the terraces.

The Incas did not have animals which they could ride, nor did they have any other means of traveling from place to place. They used two somewhat similar animals, the llama and the alpaca, however, as pack animals. Meat and wool were also obtained from the llama and the alpaca. These animals are still raised in this area of South America.

**Cuzco, the Center of the Inca Empire.** The capital of the Inca empire was Cuzco, Peru. Find it on the map on page 82. It is located in southeastern Peru at an altitude of about 12,000 feet.

Because the Incas needed a good way to get messages to outlying parts of the empire, they built roads leading out from Cuzco. These roads were not like the roads we know, but were wide paths built through the high, steep mountains. Suspension bridges, held by cables made of vines and willow trees, were built across streams. Runners carried messages in relays from Cuzco to all parts of the empire, much as the Pony Express carried mail.

In Cuzco itself, beautiful temples and palaces were built of stone and decorated with gold and silver. The stones were cut and fitted together without the use of cement. They were so perfectly fitted that many ancient walls still are in use today. Earthquakes which have destroyed more recently constructed buildings have caused little or no damage to these ancient walls.

The Incas traded by bartering instead of using money. Each farmer had to contribute one-third of his produce to the sun god, and another third to the Inca. Much of this food was placed in storehouses and used in times of famine.

**Peru under the Spaniards.** Spanish explorers looking for gold and silver reached Peru in 1522. Francisco Pizarro led the first Spanish expedition southward from Panama to Peru. Upon his return to Spain, he received permission from the Queen of Spain to conquer the Incas and bring the land under Spanish control. The conquest of Peru by Pizarro and his small band of 400 men is one of the amazing stories of history. Part of Pizarro's success probably is due to the fact that the Incas had never before seen horses. Spanish cannon and guns, however, were largely responsible for the success of Pizarro's conquest.

During the reign of the Incas, the highlands area of Peru had been the center of most activity. The Spanish were interested in trade, however, so they started to develop the coastal region. They founded Lima in order to have a capital city near the coast. They sent expeditions northward, southward, and eastward from Lima to bring the people under Spanish control. For a time, Lima was the most important city in South America. Large haciendas were started along the river valleys in the coastal region. The work was done by the Indians, many of whom died from hard work and from diseases carried by the Spanish from Europe.





Archaeologists learn much about the Incas by studying the ruins of the cities built about 1,000 years ago.

**Independence.** Because Spanish forces in Lima were large and strong, Peru was one of the last Spanish colonies to gain its independence. General José de San Martín, who led the revolutions in Argentina and Chile, also led the first revolution in Peru. The final victory over the Spaniards was won under the leadership of General Antonio José de Sucre. Since Peru achieved independence, it has had many disputes and several wars with neighbors over the location of boundary lines.

**Peru Today.** Peru today is the third largest country in South America, about as large as the combined size of Texas, New Mexico, and Arizona. It has a population of about ten and one-half million people. Two-thirds of the people live in rural areas, and almost half of them are Quechua or Aymará Indians. Many of the remaining population are mestizos, most of whom live in cities. The largest city by far is Lima, which has almost two million people.

**Regions in Peru.** Peru can be divided into three main regions. West of the Andes is a dry coastal zone about 1,100 miles long and from about 50 to 110 miles wide. This region extends from the coast to an altitude of about 6,500 feet in the foothills of the Andes. Several port cities and Lima, the capital, are located in this narrow coastal strip. Although this region is



The Incas built terraces to keep rain water from running off the fields too rapidly. Some of these terraces are still in use on the hillsides near Cuzco.







Outside the National Cathedral in Lima is a statue of Pizarro. It was built on the site of the original cathedral for which Pizarro laid the cornerstone in 1535.



Many Indians of the highlands still use crude tools and primitive methods to plow the soil and spin their wool.

a coastal area and is in low latitudes, it has very little rainfall because the Andes block the moisture-bearing southeast trade winds. West of the mountains, there are usually less than two inches of rainfall a year. Nevertheless, temperatures are mild because of the cold Peru Current. Do you remember where this ocean current flows? During the winter months of May through November, this region has fogs and chilly weather. During the rest of the year, the days are warm and sunny. Much of the cultivated land in Peru is located in this coastal area. Most of the farms are in river valleys where irrigation is possible.

The second main region of Peru is highland. More than half the people of Peru still live in the highlands area, and much of the land there still is cultivated. Many of the people live much as they did in the time of the Incas, 400 years ago. Crops raised in this area are similar to those raised in the altiplano of Bolivia—quinoa, barley, and potatoes.

The climate in the highlands area varies from place to place, depending on altitude and topography. Most places have fairly warm days and very cool nights. Mountain peaks more than 15,000 feet high are snow-covered most of the year. The highest peak is Mount Huascarán, which is 22,205 feet in altitude. Eastern slopes of the ranges in most areas receive more rainfall than



do the western slopes. Much of the land is used as pasture for sheep, llamas, alpacas, and some cattle.

The third main region includes two areas—the forested eastern slopes of the Andes, and the northeastern lowlands area which is part of the Amazon Basin. This region usually is called the Montana. Rainfall is heavy throughout the year. Rivers have cut deeply into the land, forming many ridges and valleys. The Montana, therefore, is a difficult region through which to travel. So far, the only road built in the area extends from Lima inland as far as Pucallpa on the Ucayali River. From Pucallpa, a journey eastward across South America can be made by water on the Amazon River. Most cities in this region depend upon water and air transportation for supplies brought from other lands.

The lower hillsides in the Montana and the land in the Amazon Basin are covered with tropical rain forests. Some of the valuable lumber in these forests is now marketed. Iquitos, on the Amazon River, is the largest city in this region and the main center for the lumber industry. Steamers can sail up the Amazon River as far as Iquitos to take on a lumber cargo.

Other forest products of some importance in northeastern Peru are wild rubber, balata, Brazil nuts, and ivory nuts. Balata is a product quite similar to natural rubber, which is used in making golf balls and in insulating electric wires. Coca leaves and cinchona bark, from which quinine is made, are gathered. Crops such as tea, coffee, cacao, manioc, bananas, rubber, and rice are grown, although soils are not very fertile. This region undoubtedly will soon become more important because petroleum has been found.

**Agriculture in Peru.** Most of the people in Peru make their living by farming, grazing animals, or forestry. Peru's two most important export crops, cotton and

sugar cane, are grown mostly on large plantations on the irrigated coastal plain. Because of modern farming methods, including the use of fertilizers and machinery, crop yields have been raised considerably in recent years. Cotton which is not needed by textile mills in Peru is exported to the United Kingdom, Belgium, Germany, Chile, France, Japan, and the Netherlands. Sugar is exported to Chile, Japan, the United States, Great Britain, and Bolivia. Other crops raised on the coastal plain and in sheltered mountain valleys are wheat, rice, potatoes, and corn.

Although farming practices have improved greatly in Peru, food is still scarce because of the small amount of cultivable land and a rapid population growth. To help overcome the food shortage, Peru has developed a large fishing industry. Many of Peru's 800 fishing boats, however, search for anchovetas, a tiny fish which is used to make fish meal. Exports of fish meal, a good food for cattle and poultry, now earn Peru more than \$100 million a year. Peru leads the world in exporting fish meal.

**Mining.** Since the days of the Incas, mining has been an important occupation in Peru. Only about two out of every 100 workers are employed in mining, but almost half of Peru's income from exports is from minerals. Petroleum probably will become Peru's most valuable mineral product. At the present time, most of it is pumped in the northwest coastal area. For years, Peru has exported some oil, but demand within the country for petroleum products is increasing. Unless the oil fields in the Amazon Basin are developed soon, Peru may have to import some petroleum.

Peru's most valuable mineral export at the present is copper, followed by lead, silver, iron, and zinc. Other minerals of importance include gold, vanadium, tungsten, bismuth, and mercury. Vanadium, tungsten, and bismuth are used in making



different kinds of steel. Some coal is mined, which makes it possible for Peru to manufacture steel. The first steel mill in the country was opened in 1958. Until that time, most iron ore was exported.

**Manufacturing.** Manufacturing industries in Peru are growing rapidly. About 18 out of every 100 workers now make their living in industries, most of which are located in Lima. Among the important industries are textiles, beverages, and foodstuffs. Other manufactures are leather products, glass, clothing, paper, and chemicals. The paper industry uses the pulp from sugar cane, which is known as *bagasse*. Fish canneries and a steel mill have been opened in recent years, and 14 automobile assembly plants are expected to be built by 1966. As many as 30,000 vehicles a year will be assembled in Peru. There are also a number of foundries and cement plants.

**Transportation.** As a result of industrial growth, Peruvians have a higher standard of living than do the citizens of Bolivia and Paraguay. Nevertheless, as in Bolivia, the lack of good transportation still hinders industrial development. Thousands of miles of good highways have been built in Peru in recent years, and more are under construction. As the map on page 52 shows, the Pan American Highway extends along the coast through Peru. In southern Peru, a branch of this highway runs inland to

Lake Titicaca and on to La Paz, Bolivia. Railroads extend inland from the coast at several points, but these lines are not connected into one railway system. Many goods have to be moved, therefore, from one coastal city to another by ship, and then inland by rail or truck. Callao, located on the coast west of Lima, is the largest and best-equipped port city. Mollendo, San Juan, and Ilo, all south of Callao, are important ports from which minerals are exported.

We have learned that building railroads and highways through the Andes is difficult and costly. The Central Railway of Peru, which extends eastward from Lima, was a remarkable engineering accomplishment. The train climbs the steep slopes of the mountain range on zig-zag ledges. A spiral tunnel built in one peak allows the train to enter the mountain, circle completely around, and come out at a higher level. A train going from Lima to Huanayo, 285 miles away, crosses 58 bridges, goes through 68 tunnels, and up 21 zig-zags. The high point on this rail line is 15,889 feet above sea level, the highest point reached by any standard gauge railroad in the world.

As in other South American countries, the airplane is widely used for transportation within the country and to other nations. Nine international airlines serve Lima, and regular air service is provided

Cotton raised in Peru commands a high price in world markets because of its long fibers.



How will modern highways, built to replace old trails, affect life in the highlands?







Building a railroad through country such as this in the Peruvian Andes was difficult and costly. This picture shows a portion of the Central Railway with a highway below it.

in many cities of Peru by four Peruvian airlines. Some of the cities in the northeast are served only by air transportation.

**Government and Education.** Peru is a republic, having a president and two legislative bodies. All members of Congress and the president are elected at the same time for six-year terms. Thus, all

Most airports in larger South American cities have modern buildings and equipment. This is the international airport in Lima.



officials could be changed at one time. In 1962, military men seized the government after an election which they said was not fairly run. Another election was held in 1963, and another president was elected.

Children between 6 and 16 years of age are required by law to attend school. In cities all children do attend school, but many in mountainous areas still do not get an education. About half the adults in Peru still are unable to read and write Spanish, the official language.

### QUESTION BOX

19

1. In what ways was the Inca civilization remarkable?
2. How did Pizarro and his men gain control of the Inca empire?
3. What are the three main regions of Peru? How do they differ?
4. What are the main export crops of Peru? Where are they grown?
5. Why is it difficult to travel from one place to another in northeastern Peru?
6. What products are obtained from the forests of northeastern Peru?
7. Peru now leads the world in exporting what product?
8. What are the main mineral exports of Peru? What mineral is likely to be of greater importance within a few years?
9. Why has it been possible to begin a steel industry in Peru?
10. What other products are manufactured in Peru?
11. In what way is the Central Railway of Peru unusual?
12. What differences are there in the length of terms of elected officials in Peru and the United States?
13. Why do Peruvians enjoy a higher standard of living than Bolivians and Paraguayans?



## ECUADOR

Ecuador, one of the smaller countries in South America, is named for the equator which crosses it. Ecuador means *equator* in the Spanish language. Ecuador is about the size of the state of Arizona. At one time, the eastern border of Ecuador reached beyond Iquitos, which is now in Peru. Ecuador and Peru both claimed this territory. The two countries finally settled their dispute about the land, and most of it was given to Peru.

**Early History.** After conquering Peru, Pizarro sent his forces north to conquer the Incas in Ecuador. The Spaniards then divided the land among themselves, forming large estates, and forced the Indians to do most of the work on the land. In 1740, the Vice-royalty of New Granada was established. It included the land which is now Colombia, Venezuela, Ecuador, and Panama. By the early part of the 19th century, movements for independence were gaining strength throughout New Granada. Under the leadership of Simón Bolívar, Spanish rule was finally overthrown in the regions which are now Venezuela and Colombia. Bolívar then united these two countries in a new nation called Greater Colombia. In 1822, Ecuador achieved independence when General Antonio José de Sucre, aided by troops under General José de San Martín,

defeated the Spanish in battles near Quito. Bolívar then persuaded Ecuador to become part of Greater Colombia. This nation lasted only until 1830, when both Venezuela and Ecuador withdrew from it to form independent nations. Ecuador then adopted a constitution and elected its first president. Since that time, many revolutions have overthrown governments in Ecuador, but the nation has remained free and independent.

Present-day Ecuador has 17 provinces and one national territory, the Galápagos Islands in the Pacific Ocean near the equator at about 90° West. (See map, page 53.)

When the Spanish first arrived, all of the people in Ecuador were Indians. Today, about four out of ten people are Indians, and another four out of ten are mestizos. About one-tenth of the population is white, and the other one-tenth is Negro.

**Natural Regions of Ecuador.** The Andes Mountains divide Ecuador into three natural regions. West of the mountains is a tropical coastal region. Through the middle of the country is a highlands area, including two long, high ranges extending from north to south, and high valleys and basins. East of the mountains is a section known as the Oriente, which includes the eastern slopes of the Andes and a small section of the Amazon plain.

An old print shows San Martín turning over his command to Simón Bolívar to unite the colonial forces against Spain in 1822.

Many dwellings along the coastal lowland region in Ecuador are built on stilts. Can you give any reasons why?







*Ponchos*, or brightly-colored blankets with a slit for the head, are worn to market in a provincial capital in the highlands of central Ecuador.

**The Coastal Region.** The coastal plain, about 350 miles long and from 50 to 100 miles wide, covers about one-fourth the land area of Ecuador. The alluvial soil is fertile, and enough rain falls throughout most of the area for tropical crops to grow. The northern part of the coastal plain receives more rainfall than that farther south. Bananas, cacao, coffee, sugar cane, avocados, mangoes, citrus fruits, and rice grow well in this region. On higher, better drained lands, cattle are grazed on the grassy slopes. Alfalfa and clover are grown on some irrigated land as feed for dairy cattle. Cotton and pineapples are also grown.

Most of the export crops are raised and most of the country's commerce is carried on within the coastal region. In recent years, Ecuador has been the world's leading country in exporting bananas. Coffee, one of the new commercial crops in Ecuador, is now the second most valuable agricultural export. Cacao, which at one time was the leading export, is now third in value. Most of the cacao trees unfortunately became diseased and the industry was almost ruined. Scientists now have learned how to control the diseases, and the production of cacao beans is increasing.

**The Highlands.** The two ranges which extend across Ecuador are among the highest in the Andes Mountains. Many of the

mountains are, or were, volcanoes. In fact, there are so many volcanoes in central Ecuador that the valley between the ranges is called the "Avenue of Volcanoes." Mount Chimborazo, the highest peak in Ecuador, is 20,577 feet high. Mount Cotopaxi, which reaches 19,344 feet, is the highest active volcano in the world.

More than half of the people of Ecuador live in the basins and valleys between the high peaks. Most of these people are hard-working Indians who live much as their ancestors did hundreds of years ago. They grow corn, which is their basic food, potatoes, lima beans, peas, onions, cabbage, and many other vegetables. In lower, sheltered valleys, fruits such as apples, peaches, pears, plums, strawberries, and cherries are grown. Wheat and barley are also raised. Many sheep are grazed on the mountain slopes, and some cattle, pigs, and chickens are kept by the farmers. Throughout the highlands area, the climate varies with the altitude. Rain falls throughout the year, but the wettest months are December to April. Above an altitude of 9,000 feet, frost is common; above 15,000 feet, the mountains are covered with snow throughout the year.

**The Oriente.** In Ecuador, the eastern slopes of the Andes are steeper than the western slopes and are cut by deep river valleys. Only a few nomadic Indian tribes



live in this region. Although the Oriente contains about half of the land area of Ecuador, it has practically no economic value at present. Most of the land is covered with tropical rain forests in which about 600 different kinds of trees grow. Among them are mahogany, cedar, walnut, camphor, balsa, and rubber. As yet, little use is made of these forests because of the difficulty of transporting products from the region. There are no railroads, roads, or airports in eastern Ecuador.

**Forest Products.** A number of products are obtained from forests on the western slopes of the Andes. The most important exported forest product is balsa wood, which is lightweight and strong. Balsa is used to make model airplanes and many other products which must be strong and lightweight. Other products gathered in the forest include cinchona bark, kapok, which is used in making life preservers, and tagua palm nuts, from which buttons are made. Leaves of the toquilla palm are gathered and woven to make straw hats.

**Industries in Ecuador.** Since very little manufacturing is done in Ecuador at present, many products have to be imported from other lands. Most of the manufacturing industries are small plants which process agricultural products. Textile mills weave cloth from wool and cotton. Fruits and vegetables are canned so that they may be shipped to other parts of the country. Some factories make cigarettes and cigars, paper from banana fibers, furniture, and soap. Enough paint, matches, and cement are produced to meet the people's needs.

Panama hats are the only manufactured export of Ecuador which is known throughout the world. Ecuador is the main producer of these hats, which are called Panama hats because at one time they were sold mainly in Panama. Weaving hats once was a major occupation of many people living in rural areas. In recent years, the



Does this picture show why Quito, "the capital on the equator," has a moderate climate?

demand for these hats has decreased. Only a few of them now are exported.

**Mineral Wealth in Ecuador.** At the present time, Ecuador has little known mineral wealth. Some petroleum is produced near the coast west of Guayaquil, Ecuador's main port city, but oil production has been decreasing in recent years. At the same time, demand for petroleum products has been increasing. As a result, Ecuador must import petroleum in order to meet its needs. Small amounts of gold, silver, lead, and copper are mined, but sale of these minerals brings less than two dollars of every hundred earned in Ecuador. Ecuador lacks power sources, especially coal. Considerable hydroelectric power could be produced by harnessing the rivers in the Andes, but this has not yet been done.

**Transportation.** Roads and railroads are two of Ecuador's greatest needs. As in other native Indian countries of South America, both are difficult and costly to build because of the bridges and tunnels which are necessary. Nevertheless, a government-owned railroad has been built from Guayaquil, the port on the Guayas River, to Quito, the capital city in the highlands. Building this railroad was as difficult as building the Central Railway in Peru. In recent years, the railroad has been extended from Quito to San Lorenzo, a port on the coast near the Colombian border. As yet, port





A banana stem contains from 50 to 100 bananas, and is cut just before shipment.

facilities at San Lorenzo are not adequate, but in time, more goods may be imported through San Lorenzo.

**Principal Cities.** Quito, the capital city, is the second largest city in Ecuador. It is located in the highlands at an altitude of more than 9,000 feet. Because it is almost on the equator, days are about the same length all through the year, and temperatures vary only slightly from day to day. Daytime temperatures are cool, and, after sunset, the temperature drops rapidly. Warm clothing must be worn throughout the year. Quito is an interesting city with old sections, which have steep narrow streets, and new sections with broad boulevards and modern stores. Not much manufacturing is done within the city, but there are some textile mills, shoe factories, and plants making soap and medicines.

View of the market at Otavalo. About what hour do you think the picture was taken?



A few miles north of Quito is a city which is one of the most interesting in Ecuador because of its famous market. Otavalo is the trading center for a group of Indians who still speak Quechua, the language used by the Incas. Indians throughout this region still carry on their crafts in much the same way that they did hundreds of years ago. Many tourists from other lands visit Otavalo to buy beautifully woven woolen ponchos, shawls, and blankets. Saturday is market day in Otavalo. The Indians leave their homes in the mountains very early, and are usually in the market place by 5:30 or 6:00 A.M. By 7 o'clock, most of the better goods are sold; by noon, the market is almost empty.

Guayaquil is Ecuador's largest city and main port. It is located about 40 miles up the Guayas River and has probably the best harbor on the Pacific Coast of South America. Railroads extend northward from Guayaquil to Quito and westward to Salinas. Most of Ecuador's imports enter the country at Guayaquil, and about half of the exports are shipped from this port. Because of its location at low altitude, almost every day is hot and humid in Guayaquil.

The third largest city in Ecuador is Cuenca, which is located in the highlands southeast of Guayaquil. The Indians in the Cuenca region are known for their wood carving, silver work, and hand-woven hats.

These women are weaving Panama hats. The finest hats require months to complete.







Iguanas, which sometimes grow to be six feet long, watch men who have come to explore an island in the Galápagos. Huge, 500-pound turtles are found there.



**Government and Education.** The president of Ecuador is elected by the people for a term of four years. He cannot be re-elected until another four-year term has passed. Members of the Senate are also elected for four years, but members of the Chamber of Deputies are elected for two-year terms. In 1963, five military officers took control of the government. They have ruled as a **junta** ever since. A junta is a council or committee. Ecuador's constitution guarantees freedoms of religion, speech, and assembly. Most of the time these freedoms have been supported by the junta.

Both public and private schools are under the control of the national government. All children are required by law to attend school, but many in mountainous areas do not have an opportunity to do so. The government is building schools in many small communities and trying to educate enough teachers. Many adults have been taught to read and write in recent years.

**Galápagos Islands.** Five hundred miles west of Ecuador are the volcanic Galápagos Islands. There are 13 main islands and several smaller ones in the group. The islands are named for the huge tortoises or turtles which are found there. Some of these tortoises weigh as much as 500 pounds and are from two to three hundred years old. The islands are famous because of the

many kinds of wildlife found only there. Many famous scientists have gone to the islands to study the wildlife.

### QUESTION BOX

20

1. What leaders helped Ecuador obtain independence from Spain?
2. What are the three natural regions in Ecuador?
3. What are the main export crops of Ecuador? Where are most of these crops grown?
4. What forest products are obtained? Where are the forests located from which these products come?
5. What crops are grown in the basins and valleys of the highlands region?
6. What is the "Avenue of Volcanoes"? Why is it so named?
7. Why is the Oriente of little value to Ecuador at present?
8. Why do you think few industries have been developed in Ecuador?
9. What is the climate like in Quito? In Guayaquil? What causes the differences?
10. Who was governing Ecuador as this book was written? What is a junta?
11. Why do the Galápagos Islands attract scientific expeditions?



# BRAZIL

Brazil is a very large country, containing almost half the land area of the South American continent. Every country in South America except Chile and Ecuador has a border with Brazil. Only four countries in the world are larger—the U.S.S.R., China, Canada, and the United States of America. Until Alaska became the 49th

state, the United States was smaller in land area than Brazil.

The official name of the country is the United States of Brazil. There are 20 states and several territories in Brazil. The country is rapidly becoming an important industrial nation, and has long been a leading exporter of agricultural products.







**History of Brazil.** You have already learned that Portuguese is the official language of Brazil. The reason why this language is spoken in Brazil is explained by the early history of the country.

In 1500, the king of Portugal sent Pedro Álvares Cabral with a fleet of ships to the East Indies by way of Africa. The northeasterly trade winds drove the ships westward to the shores of South America. Cabral landed at the present site of Pôrto Seguro and claimed the land for Portugal. He called the new land Vera Cruz which means *true cross*. Because the early colonists exported pau-brasil, or brasilwood, to Portugal, they soon came to be called Brasileiros and their land known as Brazil.

During the first 30 years after the discovery of Brazil, very little exploration or settlement took place. When the Spanish discovered the great wealth of gold and silver in Peru, the Portuguese became much more interested in Brazil. The king gave large grants of land to 15 "governors" who had the authority to develop their territories. These land grants extended inland

from the coast to Spanish-held territory. In 1548, the king appointed Tomé de Sousa as governor-general of the colony. Tomé de Sousa established his capital at Salvador. Later, in 1763, Rio de Janeiro became the capital city.

Almost all the early settlements were made along the coast and little attempt was made to move inland. In the 17th century, gold and diamonds were discovered in the present states of Mato Grosso, Minas Gerais, and Goiás. Thousands of new immigrants came from Portugal and, for the first time, inland settlements were started.

In 1808, after Napoleon's armies had conquered Portugal, the royal family of Portugal fled to Brazil. Shortly after Napoleon was defeated in Europe and Portugal again became independent, the king returned to his homeland, leaving his son, Dom Pedro, to govern Brazil. About a year later, Dom Pedro declared Brazil's independence from Portugal. Until 1889, Brazil was a monarchy but in that year the royal family was overthrown in a revolution and Brazil became a republic.



**The People of Brazil.** When the Portuguese first came to Brazil, they found a land almost uninhabited. Small tribes of Indians lived at various places throughout the country. Members of one of these tribes, the Arawaks, built houses, raised food crops, made good canoes, wove cloth, and made pottery for use in their homes. Other more primitive Indian tribes lived in brush shelters. They had not developed methods of agriculture but relied on the forest, and hunted and fished for their food. There are still quite a number of Indians in the Amazon valley and the Mato Grosso area. Some who are still isolated live much as their ancestors did centuries ago.

To obtain workers for their sugar-cane plantations near the coast, the Portuguese enslaved some of the Indians and also brought Negroes as slaves from Africa. Many descendants of these slaves still live in Brazil. Most of the Brazilians, however, are mestizos, or immigrants or descendants of immigrants from Europe. In addition to Portuguese, many Germans, Dutch, Swiss, Belgians, Swedes, Poles, Russians, and Spaniards have come to Brazil. Quite a number of Japanese have moved there in recent years.

As the population map of South America on page 54 shows, most people in Brazil still live near the coast. Only two of the

The low mountains in this part of the Brazilian Highlands near São Paulo are the eastern edge of the great plateau.



large cities, São Paulo and Belo Horizonte, are not seaports. There are several reasons why most of the people settled and still live near the coast. Among the reasons are ease of transportation, sufficient and reliable rainfall, productive soils, mild temperatures, and rich forest and mineral resources. In recent years, however, the government has been working to develop the interior of the country. As a part of this development, a new capital city, Brasília, has been built about 600 miles northwest of Rio de Janeiro.

**Regions of Brazil.** Brazil may be divided into three main regions—a coastal lowland, the Brazilian Highlands, and interior lowlands. The lowland area along the Atlantic Coast varies in width from a few miles to nearly 100 miles. This strip, densely populated from Recife to Pôrto Alegre, is one of the most important agricultural areas in Brazil.

West of the Atlantic coastal strip are the Brazilian Highlands. Find them on the map on page 104. The highlands rise abruptly from the coastal lowlands and slope gently toward the interior of the country. The Brazilian Highlands are not nearly as high as the Andes, and in many ways are like the Appalachian Highlands in the eastern part of North America. Both are old mountain ranges which have been worn down by millions of years of erosion. Most of the peaks in the Brazilian Highlands are rounded, and, except in the north where too little rain falls, most of the ranges are forest covered. The highest peak in the region, Mt. Bandeira, is only 9,462 feet above sea level. Only a small part of the region, however, is more than 3,000 feet above sea level.

As the map shows, a few short rivers flow from the highlands eastward into the Atlantic. Most of the region, however, is drained by long tributaries of the Paraná and Amazon Rivers which flow southward



and northward. The huge central plateau west of the highlands is less than 3,000 feet in altitude. It has fertile, productive land but, as yet, few people live there.

In northeastern Brazil the highlands are covered with scrub forests, and this section may best be described as semi-desert. This area does have some rainfall, but it has long periods of disastrous droughts. During the first half of the twentieth century, many farmers moved westward from Recife to farm the fertile soils of this region. In recent years the area has had so little rain, however, that many of the farmers have been forced to leave. Dust storms, like those in the southwestern United States, have caused crop failures year after year. (See map, page 277.)

Interior lowlands, both in the north and south, make up the third region of Brazil. To the south, the lowlands are drained by the Paraguay and Paraná Rivers; to the north, by the tributaries of the mighty Amazon. The lowlands of the Amazon Basin are largely covered with tropical rain forests known as *selvas*. Much of the lowland in the south is rolling grassland.

**The Amazon River and Basin.** The Amazon River, as you undoubtedly know, is the world's largest and one of the world's longest rivers. The distance from its source in the high Andes of central Peru to its mouth in northeastern Brazil is about 3,900 miles. Near Marajó, an island which has been

formed by the river at its mouth, the Amazon is more than 150 miles wide and about 200 feet deep. The Amazon is so large that, at some places, a person traveling upriver cannot see the river's banks on either side. As far upriver as Leticia, which is located where the boundaries of Brazil, Peru, and Colombia meet, the Amazon is a mile wide. Between Leticia and the Río Negro, the Amazon in Brazil is known as Río Solimões, as the map on page 104 shows.

All year long, ocean-going ships can steam up the Amazon as far as Manaus, about 1,000 miles from the ocean. Manaus is the main inland trading and shipping port in the Amazon Basin. As maps show, Manaus is not on the Amazon River but on the tributary named Río Negro, about 12 miles upstream from where it joins the Amazon. During periods of high water in the very rainy season, ocean-going vessels can sail on up the Amazon as far as Iquitos, Peru. Smaller boats can go as far as Iquitos all during the year. Upstream from Iquitos, tugboats and flatboats are used to move forest products and other supplies on the upper course of the Amazon. One reason why the Amazon River is navigable for so many miles is that it flows through a lowland area during most of its course. As a result, the river flows very slowly, sometimes seeming more like a lake than a river.

Soils in the Amazon Basin generally are not very fertile because so much rain falls

*Below.* Fishing boats on one of the many inlets in the 150-mile wide estuary of the Amazon. *Right.* Ocean-going vessels can reach Manaus, an interior city in the Amazon Basin, all during the year.





on the land all during the year. Most regions of the world with heavy rainfall have soils which are not very fertile. When there is too much rain, the water seeps far into the soil. Minerals in the soil dissolve in the water and are carried down below the roots of the plants. Thus, the plants are deprived of needed minerals. This process is known as **leaching**. Since minerals and decayed plant material are needed to produce good crops, large amounts of fertilizer must be used in such areas.

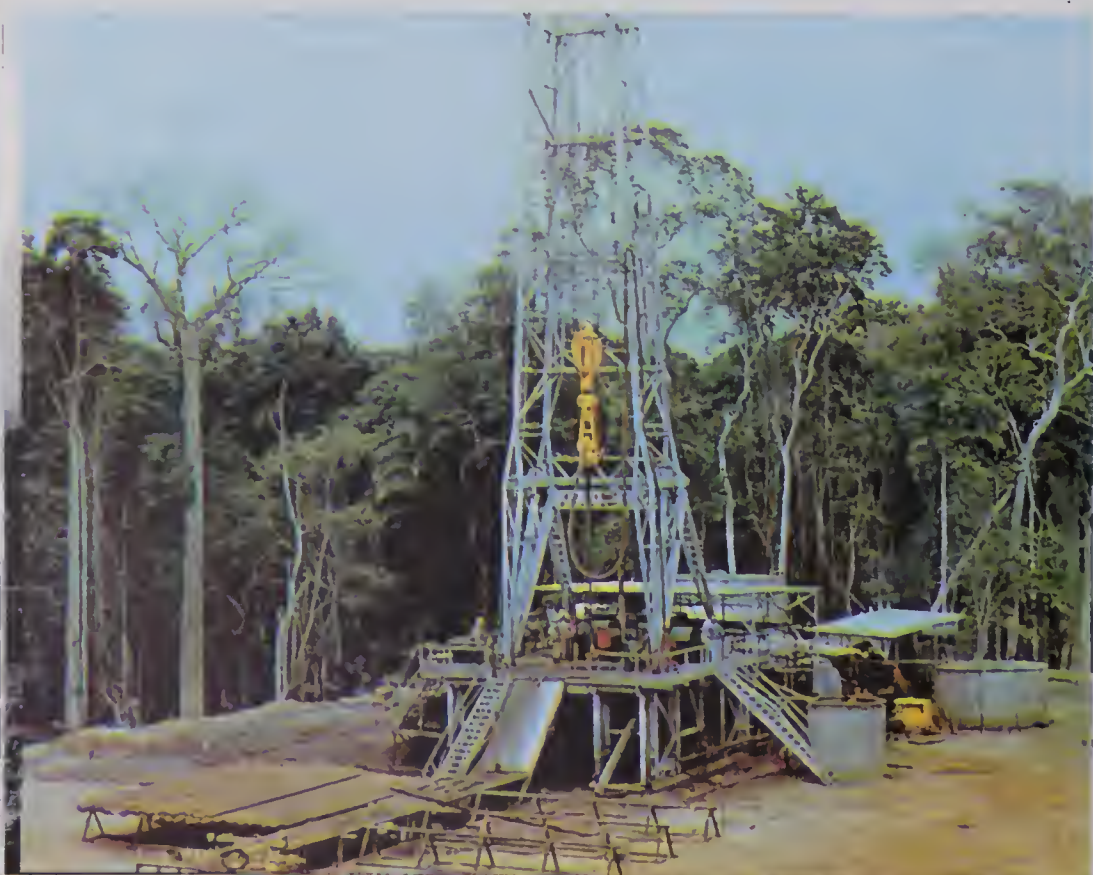
Because of the heavy rains, the Amazon and its tributaries regularly overflow, flooding the lowlands along the main streams. As the water recedes, new islands are formed. By the next flood season, these islands are covered with thick, rapidly growing plants which are frequently called **jungle**. The new floods wash away this jungle vegetation as the water covers the islands. Jungles often are found along streams in the forests where the sun's rays reach the ground. In the selvas, however, the large trees provide so much shade that vegetation close to the ground is much thinner.

As yet, there are very few people in the Amazon Basin. As the map shows, there are several small cities along the main streams, many of which are now served by

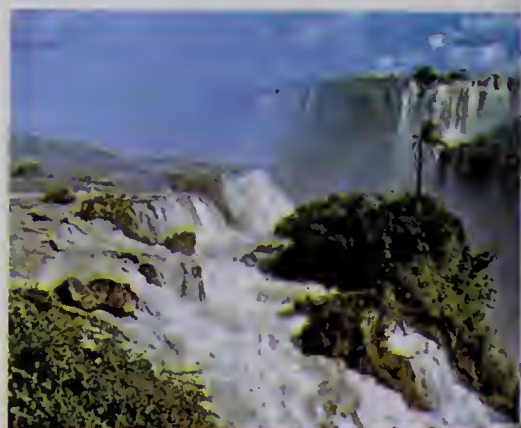
airplanes as well as steamships. The only highway in the region extends southward from Belém, the port city near the mouth of the Amazon, to Brasília, the new capital.

**Climates in Brazil.** Most of Brazil is in low latitudes. As the rainfall map on page 277 shows, much of the land in the Amazon Basin receives more than 80 inches of rain each year. Parts of the area receive from 60-70 inches. Because this region also is at a low altitude, it has a warm, humid climate with little change in temperature from day to day. The nights are a little cooler than the days. More rain falls throughout most of the region between November and April than between May and October. (See page 41.) Manaus, for example, receives more than nine inches of rain during each of the three months of January, February, and March. During July, August, and September, by contrast, only about two inches of rain falls each month. On the other hand, the average daily temperature at Manaus varies only 3.1 degrees during the year, from 79.7 in March to 82.8 in October.

Do you remember or can you figure out why Manaus has such even temperatures throughout the year? Near the equator,



View of a clearing in a rain forest. In such a forest the sun's rays are blocked in most places by heavy foliage overhead. Iguassu Falls, 237 feet high and more than two miles wide, are on the Brazil-Argentina border.





the sun is always high in the sky and the sun's rays strike the earth at almost the same angle throughout the year. The sun shines for about the same length of time each day, and days and nights are almost equal in length. Where such conditions exist, there are usually few seasonal changes in climate.

In this hot, humid climate, trees and plants grow rapidly. Most of the land is covered with tropical rain forests as the map on page 104 shows. Do you remember what these forests are called? In some areas, where a little less rain falls, there are tropical savanna lands—grasslands with scattered groves of trees.

The Guiana Highlands in northern Brazil have a tropical savanna climate. As the map shows, most of this land is grassland. Very few people live in this part of the country. The northern slopes of the Guiana Highlands usually receive considerably more rainfall than do the southern slopes. Can you figure out why this happens?

In the Brazilian Highlands, most of the rain falls during the summer season. The Brazilian Highlands have a mild climate throughout the year. This region is higher and considerably cooler than the lowlands of the Amazon Basin. Temperatures at different times of the year and at different times of day vary much more than they do in the hot, humid Amazon Basin. This mild climate is quite similar to that along the Gulf Coast in the United States, which is known as humid sub-tropical. In most areas of the highlands, there is plenty of rainfall for agriculture, and good grassland and forests are found in the region. Considerably more rain falls in the southern part of the region than in the north, as we have learned. In the far south, some snow usually falls at high elevations during winter months but most of the region rarely has below-freezing temperatures.

## QUESTION BOX

21

1. What countries are larger than Brazil?
2. Why did the Portuguese explore and settle Brazil?
3. What kind of government did Brazil have before it became a republic?
4. Why do most of the people live along the coast, especially in the southeastern part of the country?
5. What are the three main regions of Brazil? What are the land and climate like in each region?
6. Why do you think it is difficult to map exactly the course of the Amazon River and the islands within the river?
7. Why is there very little variation in temperature throughout the year and each day in the Amazon Basin?
8. What is the process called leaching?

**Forest Products.** Brazil has extensive forests, as the map on page 104 shows. In the forests of the Amazon Basin are mixed stands which include valuable hardwoods. As in other rain forest areas, cutting logs and transporting them to the nearest tributary are major problems. Nevertheless, some mahogany is exported each year from the Amazon Basin, much of it to the United States. As you know, mahogany is a hardwood which is used in making fine furniture.

At one time, the Amazon forests were a major source of natural rubber. Then, large rubber plantations were established in Africa and the Far East. Very little rubber is obtained in the Amazon Basin today. A few plantations have been started there, but most of the world's natural rubber comes from the other continents.

Forests are also found along the Atlantic coastal strip and in highlands of the





These men are gathering carnauba leaves, whose glossy surface contains a wax useful in polishes and varnishes. *Right.* Spraying helps to insure a good crop of cacao.



south. The southern forests are made up largely of Paraná pine trees which are quite similar to the Douglas fir trees of Oregon, Washington, and British Columbia. The Paraná pines often grow to a height of 100 feet and a diameter of six feet. The wood is soft and provides fine lumber for building purposes. Most of this lumber is used in Brazil, but some of it is exported.

Other useful products obtained from Brazilian forests include Brazil nuts, tung nuts, babassu palm nuts which furnish a useful oil, carnauba wax, and kapok. Carnauba wax is obtained from the leaves of the carnauba palm and is used in making polishes for furniture, floors, and automobiles. The oil from tung nuts is used in making paints. Some yerba maté is produced in southern Brazil.

Cotton is raised on about 12 per cent of the cultivated land in Brazil.



Because Brazil has little coal, many people in rural areas use wood for fuel. Eucalyptus trees, which grow rapidly, are planted in some areas for firewood.

**The Fishing Industry.** Even though Brazil has a very long coastline, the fishing industry has been slow in developing. In recent years, fishermen from both Japan and the United States have begun to fish off the Brazilian coast. Fishing companies from these countries have built storage and canning plants at several places in Brazil. It is likely, therefore, that the industry will become more important to Brazil in the near future.

**Agriculture in Brazil.** Brazil is one of the few nations of the world which has an enormous amount of fertile land that is as yet unused. At the present time, less than one-tenth of the land is used to raise crops, and only about one-third of the land is used at all. Since the population is growing rapidly, much of the unused land undoubtedly will be placed in cultivation within the next twenty years. About fifty different crops are now grown in Brazil, and exported agricultural products have long brought Brazil most of its income from trade.

Most of the farms are on the Atlantic coastal strip and on the plateau in the southern part of the country. The main crops grown are corn, coffee, rice, cotton,



beans, cacao, manioc, wheat, and sugar cane. About one-fourth of the farmland is planted in corn, but coffee is the most important money crop in Brazil. Tobacco, grapes, citrus fruits, and vegetables also are important crops.

In some areas of Brazil, particularly in the Amazon Basin, the people still use primitive methods and tools to farm the land. In such areas, large trees are cut with axes and the underbrush is burned. Seeds are planted with a hoe or a stick, weeds are cut with a hoe or a knife, and crops are harvested by hand. Since no fertilizer is added to the soil, it is worn out after a few years of use. Another plot of land is then cleared for agriculture. Farmers using such methods seldom raise more food than is needed by their families. Such subsistence agriculture is still widespread in Brazil.

**Leading Money Crops.** Coffee, cotton, and cacao are the three leading agricultural exports of Brazil at the present time. Some sugar is also exported.

About half the world's coffee is grown in Brazil. More than half of the money received for exported agricultural products comes from the sale of coffee. Most Brazilian coffee is exported to the United States, but many European countries also buy coffee beans from Brazil.

Some coffee is grown in almost every state in Brazil, but most of it is grown in the southeastern states. The leading state in its production is São Paulo, and Santos is the main port for shipping it. The fertile soils of the plateau area in São Paulo are rich in potash, and the climate is especially favorable for coffee production.

Most of the coffee is grown on large plantations. Miles upon miles of coffee trees cover the rolling land. Though machinery is used for some of the work, much of the picking, sorting, and preparing the coffee beans for market must be done by

hand. The workers live on the plantations in homes provided for them.

Coffee trees in Brazil usually grow to a height of about 10 or 12 feet. Young trees are started from seeds in a seedbed. When the plants are about 15 inches high, they are transplanted in rows on the plantation. After about four more years, each tree begins to produce coffee berries. Enclosed in each berry, which is shaped much like a cherry, are two coffee beans. Since the berries ripen at different times, the fruit must be hand picked if high quality coffee is to result. After the berries are picked, the pulp is removed by machinery. The coffee beans are then soaked and washed to remove a sticky covering, and dried in the sun so that an outer skin on each bean becomes brittle. The beans are then placed in a hulling machine which removes this outer skin. Finally the beans are packed in burlap bags for export.

Because so much of Brazil's income depends upon coffee sales, a drop in the price of coffee on world markets can cause financial problems in the country. Recently, therefore, the Brazilian government joined with other important coffee-producing countries to establish an international coffee agency. This agency will not only attempt to increase the sale of coffee throughout the world, but also will try to keep prices steady from year to year.

Coffee that your family uses probably came from one of these areas in South America.







At the top left, choice coffee cherries, which later will be planted in clusters of 8 to 12 seeds, are shown drying. In about 18 months, the best plants are transplanted in well-drained fields. Red cherries ready for picking are shown at top right. Impurities and imperfect beans are removed in the large tanks at the left, and then the "pulped" beans are spread evenly to dry in the sun. When the beans have dried to a uniform color, machines are used to remove their dry hulls. Beans are shipped in 132 lb. sacks to world markets. Highly-trained testers at these markets sample the taste and aroma of different coffees to achieve standard blends for wholesalers.





Brazil's second most valuable money crop is cotton. At one time, cotton was grown only in northeastern Brazil, but now most of it is grown near São Paulo. On some plantations, both cotton and coffee are raised. Most of the cotton grown in Brazil, like that grown in the southern part of the United States, has short fibers. Some of the cotton, however, comes from a cotton "tree," a much taller plant than is common in the United States. This kind of cotton is known as long-staple cotton. It has long fibers and brings high prices on world markets. Many farmers who once raised only cotton are beginning to raise other crops, including castor beans and peanuts. Cotton production in Brazil, therefore, is not increasing rapidly.

Cacao, from which chocolate and cocoa are made, is another valuable export of Brazil. Only Ghana in Africa raises more cacao than Brazil. Most of the cacao is raised in the northern part of the Atlantic coastal strip.

Brazil is also a major producer of sugar cane. Only India and Cuba produce more. Sugar cane is grown along the Atlantic coastal strip and in the states of São Paulo and Minas Gerais.

**Livestock.** Raising cattle has been an important industry in Brazil ever since the days of the first Portuguese settlers. Brazil raises more cattle than any other country, except for India, the United States, and the U.S.S.R. Cattle are raised in all states of Brazil, but especially in Rio Grande do Sul and São Paulo. Many are raised on the island of Marajó. Near the larger cities, the farmers keep dairy cattle.

Much has been done in Brazil to improve the breeds of cattle and to control insect pests which spread diseases among them. Humped zebus from India, which do well in warm climates, have been cross-bred with other Brazilian cattle to produce a new breed known as Hindu-Brazil.

At one time, Brazil exported a considerable amount of beef, but in recent years, consumption has exceeded the supply. Transportation facilities are being improved rapidly so that cattle and frozen meat may be moved easily from one section of the country to another.

Pigs, sheep, and goats are also raised in Brazil. Many hogs are fattened on corn, as they are in the United States. Goats are raised in the dry northeastern section and sheep in Rio Grande do Sul where the climate is cooler. Many horses, mules, and oxen are used as work animals on farms.

**Mineral Wealth.** Brazil has great mineral wealth. Of greatest importance at present are iron and manganese. Some estimates indicate that Brazil has about one-fifth of the world's known reserves of high-grade iron ore. The country also has the only known huge deposit of manganese in the Western Hemisphere. Manganese is needed in making steel from iron. Both of these valuable minerals are mined by the most modern methods. The largest deposits of iron ore which are worked at present are in the Minas Gerais area near Belo Horizonte. The largest deposit of manganese is in the territory of Amapá, north of the mouth of the Amazon River. A rail line has been built there to load the ore onto ocean-going ore ships.

Since no high-grade coal has as yet been found within the country, some must be imported for the steel industry. Some low-grade coal is mined in the states of Rio Grande do Sul and Santa Catarina.

Petroleum may, in time, become one of Brazil's most important mineral resources, but present production does not supply the country's needs. The government controls the petroleum industry, and does not permit foreign companies to drill for oil. The main centers of petroleum production are the fields near Salvador in Bahia. Petroleum is also found in the state of Alagoas





Dams are being constructed to harness more completely the water power of the many rivers which flow rapidly through the Brazilian Highlands. *Below.* This textile dryer is but one of the many machines powered by electricity from a hydro-electric plant.



north of Bahia and in the southern part of the state of Amazonas. The latter field may in time cause great changes in the Amazon Basin.

The Brazilian government has recently signed an agreement with Bolivia to help develop oil fields in the eastern part of Bolivia. Perhaps this source of petroleum will become more important to Brazil than its own oil fields. Consumption of petroleum products is increasing so rapidly that a better supply needs to be located.

**Manufacturing.** For many years, manufacturing in Brazil developed very slowly because of a lack of available power, but it is now increasing rapidly. About fifteen out of every hundred employed persons in Brazil now work in industries. Many of them work in or near São Paulo, which probably is the most rapidly growing industrial city in the world. About half of the thousands of products made in Brazil are produced in São Paulo.

There are several reasons for the rapid rate of growth of Brazil's industries. Among these are rich mineral deposits, a rapidly growing population, modern agricultural methods, improvement of transportation, and development of hydroelectric power. It is likely that much more hydroelectric power will be produced in the Brazilian Highlands in the future. Brazil may very well become one of the great industrial nations on earth, even though it lacks good coking coal for its steel industry.

At the present time, the textile industry in Brazil employs more workers than any other. This industry is based mainly on Brazilian cotton, but other fibers, including synthetic ones, are used. The second largest industry is processing foods, beverages, and tobacco. The products of these two industries combined account for about three-fifths of Brazil's industrial output.

Steel is produced at Volta Redonda, inland a short distance from Rio de Janeiro.





Rio de Janeiro is famous for its beautiful, sheltered harbor. *Above.* Copacabana Beach is popular all year. *Right.* An aerial view of part of the harbor.



Several other new steel mills are being constructed in Brazil, and production undoubtedly will increase rapidly in the near future. A number of automobile plants have been constructed recently. Jeeps, trucks, and passenger cars are made in Brazil by a number of companies, including some from the United States. Other rapidly growing industries are those making chemicals and paper, and those producing heavy electrical equipment such as transformers and generators. Brazil now produces enough cement for its own needs. A shipbuilding industry has been started, and some airplanes are now made for the Brazilian Air Force.



*Above.* A street market in São Paulo. *Bottom left.* A new cathedral is shown being built in Brasília, the new capital city of Brazil. *Bottom right.* View of new apartment houses in Brasília.





**Brazil's Leading Cities.** São Paulo is Brazil's largest industrial city. It now has almost four million people and has become South America's largest city. Do you remember which metropolitan area is now the largest?

Rio de Janeiro is still the working capital of Brazil, although the government has been moved officially to the new capital of Brasília. Rio has one of the most beautiful harbors in the world and is a major port city. Factories in Rio make textiles, clothing, and glass. About three and one-half million people live in Rio.

The third largest city is Recife. Recife sometimes is called the "Venice of South America" because there are many canals throughout the city. Recife is an important port, especially for exporting sugar, cotton, and coffee. About 800,000 people live in Recife.

Brasília and other major cities in Brazil are known throughout the world for their modern architecture. The artists and musicians of Brazil, as well as the architects, have produced many works of art which are famous.

**Transportation.** Improved roads, and a growing number of automobiles and trucks, are resulting in a much improved transportation network in Brazil. A fine, divided superhighway connects the port of Santos with São Paulo. Roads that are hard

surfaced extend from São Paulo to Rio de Janeiro and northward to Belo Horizonte and Brasília. Roads are constantly being extended from the southeast toward the northwest, and highways now extend inland as far as Cuiabá in the state of Mato Grosso.

Building roads or railroads through the tropical rain forest areas of Brazil is fairly difficult. Swampy, low-lying land must be bridged or filled with rock. Large trees must be cut and moved. The dense jungle must be cleared at places where sunlight filters through the trees and along the streams. Keeping cleared land open requires constant effort because plants grow so rapidly. Since few people live in these areas, it has seemed unsound to pay the high cost of construction and upkeep.

Because of the vast distances and lack of roads, particularly in northwestern Brazil, the airplane is and will continue to be important in Brazil's transportation system. Airplanes carry much cargo between Brazilian cities. About 50 cities in the Amazon Basin are served by planes. Recife and Belém expect to have jet service soon. Many international airlines serve the major cities of Brazil, providing rapid transportation from them to all points on the earth.

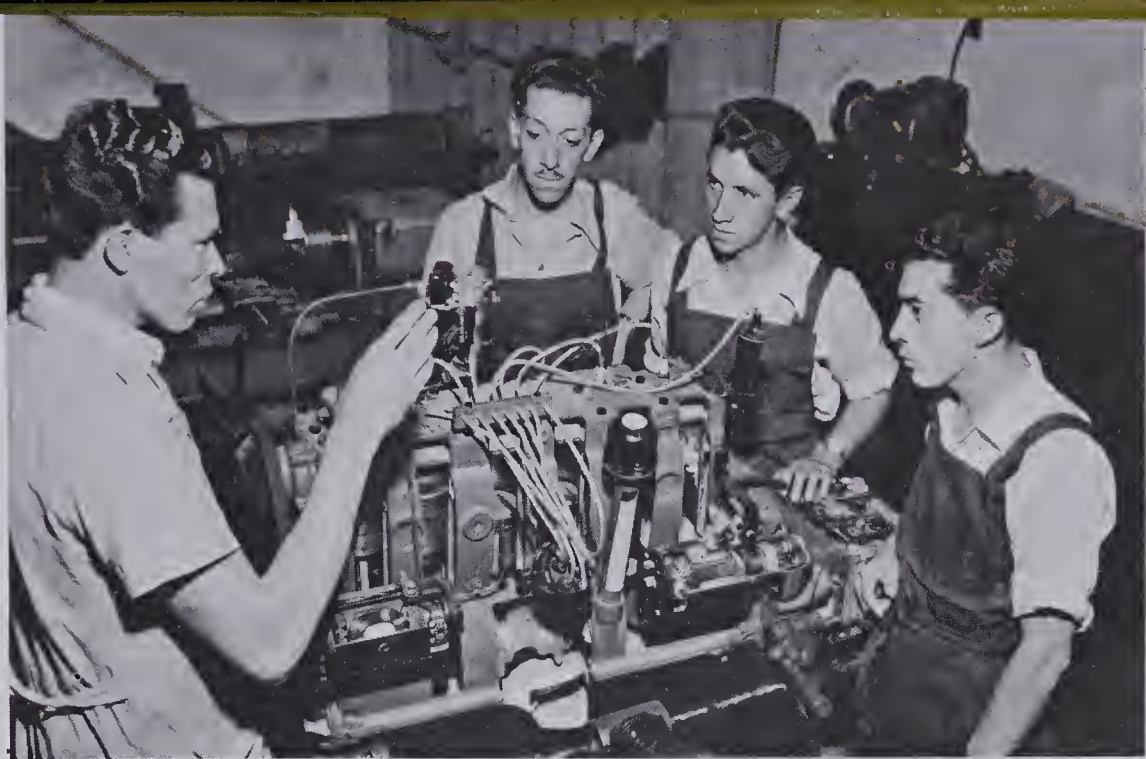
Ships carry goods along the coast and in the Amazon Basin. To encourage the



Modern transportation is needed to speed the development of Brazil's rich natural resources. This superhighway connecting São Paulo with the port of Santos is part of the highway system which, in time, will link all the important industrial centers of this large nation.



With industries developing rapidly in South America, many skilled workers are needed. Students from many countries in South America attend this school in São Paulo where short courses in needed trades are offered.



development of the upper Amazon, Manaus was made a free port in 1957. Santos, Rio de Janeiro, Salvador, and Recife are the main port cities in terms of the amount of goods moved through them.

**Government and Education.** Normally the president and vice-president of Brazil are elected for five-year terms. They cannot succeed themselves. The legislature consists of two bodies. In 1964, military men seized the government and installed their own president, an army general. Inflation had increased the cost of living 80 per cent in 1963. The military men feared that Communists were about to take over the government, so they acted to prevent that. Whether a stable economy can be developed is a real question. The resources are available, and much progress has been made in developing them; but many people are still miserably poor and unemployed. Good, responsible government has not yet been achieved in Brazil.

Primary education is free in Brazil; and, according to law, all children must attend school through the primary grades. Many children in remote rural areas, however, still do not have an opportunity to attend school. Free public secondary schools are provided by the government. There are also many private secondary schools. Secondary schools are of three kinds — regular

academic high schools, technical schools, and commercial or industrial schools. There are a number of colleges and universities.

### QUESTION BOX

22

1. What are the main export crops of Brazil? Where are the main centers of production for each of these crops?
2. Why does Brazil not export as much beef as it once did?
3. Why are the southern forests of greater value to Brazil at the present time than the vast tropical rain forests of the Amazon Basin?
4. What are Brazil's most important mineral resources at present? What mineral resource is likely to become more important?
5. What mineral needed in steel production does Brazil lack?
6. Why were manufacturing industries slow to develop in Brazil? Why is their growth now very rapid?
7. What are some of Brazil's major manufacturing industries? Where are the industries concentrated?
8. What are the principal means of transportation in northwestern Brazil?
9. For what are Brazilian cities world famous?





## NORTHERN COUNTRIES

### THE GUIANAS

North of Brazil along the Atlantic Coast are three small lands known as the Guianas. Find them on the map above. French Guiana, which at one time was a colony of France, is now an overseas department of France. French Guiana is a member of The Community, a group of self-governing nations which were once colonies of France. Members of The Community work together for improved living conditions and strengthened defenses. Surinam, which at one time was known as Dutch Guiana, is now a self-governing nation in the Kingdom of the Netherlands. British Guiana is a colony of Great Britain. It is governed by a person appointed by the Queen of England and by a legislative council whose members are elected by the people. The Guianas are the only lands in South America that still have close political ties with European nations.

In many ways, the Guianas are very similar. Together they are a little larger than the state of California, but they have fewer than a million people. Population has not grown rapidly for several reasons. The

climate is hot and humid. Soils are infertile because heavy rainfall has caused leaching. Floods occur frequently, and there are many swamps near the coast. Rivers are navigable only for a short distance inland.

**Major Regions.** As the map shows, the Guiana Highlands extend along the Brazilian border. Most of these mountains do not reach high altitudes, the highest in French Guiana being about 2,000 feet, and in Surinam a little over 4,100 feet high. The highest point in the highlands is where the borders of British Guiana, Venezuela, and Brazil meet.

Along the coast in all three countries is a narrow coastal plain. Many rivers flow across this plain, frequently flooding low areas. Much of the land along the coast is covered with water at high tide, except at places where dikes have been built by the Dutch and British. Drainage ditches also have been built across the fields in many areas to prevent flooding. The soil on the coastal plain is alluvial, and therefore is quite productive.

Most of the people in the Guianas live along the coast. At one time, large amounts



of sugar cane, bananas, and cacao were grown on plantations. A considerable amount of sugar cane is still grown near Georgetown, British Guiana. Other kinds of plantation crops have not flourished in the Guianas since slavery was abolished or stopped in the 19th century. Rice is the main food crop grown today. Most of the rice farmers are descendants of workers whom the British and Dutch brought from southern Asia after Negro slavery was abolished. These farmers grow rice in paddies, as their forefathers did and as their relatives do in southern Asia. Attempts have been made to mechanize rice agriculture in Surinam, but as yet have not been very successful.

Between the coastal strip and the highlands is a plateau area. Rivers flowing from the highlands drop steeply in rapids as they cross the plateau. Most of the plateau is forest covered, and the rest may best be described as a region of tropical savanna.

**Climate.** The Guianas have a humid tropical climate. In most areas, temperatures reach about 90° every day of the year and rarely fall below 70° at night. Temperatures are a little cooler near the coast than inland, because of sea breezes. Rain falls all during the year, but there are two very rainy seasons. A long rainy season lasts from March or April through July,

and a shorter one from November or December through January. Even during the drier seasons the humidity remains high, making temperatures seem higher than they really are.

**The People of the Guianas.** When the first European settlers arrived in the Guianas in the 17th century, they found a land which was almost uninhabited. The Caribs, a small, warlike Indian tribe, lived near the coast. A few Arawak Indians lived inland in the forested region. The early settlers faced great difficulties in establishing settlements along the Guiana coast. Wars in Europe led to battles among the colonists. Famine and disease also caused the death of many settlers. When plantations were started and cheap hand labor was needed, Negroes were brought from Africa as slaves. Quite a number of the slaves escaped from the plantations and fled inland to live in the forests as they had lived in Africa. After slavery was abolished, many workers were brought by the Dutch from Indonesia, and by the British from India. Today, the population of the Guianas is a mixture of all of these groups, plus some Europeans. The latter came to the Guianas hoping to make a fortune in plantation agriculture or by finding gold and silver. French is spoken in French Guiana, Dutch in Surinam, and English in British Guiana.

A native hut in the Guianas. This dwelling has open sides to take advantage of any circulating air in the damp, hot climate there.







View of a bauxite mine in Surinam. Most of this ore is shipped to the United States.

**Education in the Guianas.** Public schools provide primary education in the cities, most of which are near the coast. Secondary schools and colleges are found in the capital cities of the Guianas. Naturally, there are few schools in the thinly settled interior. Several mission schools, nevertheless, have been opened in the interior.

**French Guiana.** French Guiana is a little larger than the state of Maine, but it has only about 31,000 people. At one time it was known primarily as a penal colony for France, or a place where French prisoners were kept. Most of the land is forested. Of the small amount of cultivated land, about two-thirds is used for growing manioc, sweet potatoes, and yams. The remaining cultivated land is planted in sugar cane, corn, and vegetables.

The most valuable export of French Guiana is gold. Most of the gold is recovered by placer methods on the streams flowing from the highlands. In placer mining, dredges dig up gold-bearing sand and gravel from the stream beds, or the sand is forced into a container by water pressure. The sand and gravel are then separated from the heavier gold by a sifting and washing process.

As we have learned, most of French Guiana is forested. Lumbering companies are beginning to harvest some of the timber, but mixed stands and poor transportation facilities make lumbering operations difficult. Lack of transportation has slowed development of other industries, too. Almost everything needed by the people of French Guiana, except lumber and food, has to be imported.

**Surinam.** As the map shows, Surinam is much larger than French Guiana. It is about the size of the state of Wisconsin. Rice is the main crop raised today, although early plantation crops included tobacco, sugar cane, cotton, and cacao. Citrus fruits do well in Surinam, and raising them is a rapidly growing industry today. Some coconuts, bananas, peanuts, and root vegetables are also grown. Oil is pressed from the coconuts and peanuts. Many farmers keep pigs, and feed them the pulp of the coconuts and peanuts.

*Left to right: a Cayenne farmer; Indians watch Kaieteur Falls (the huge leaves are protection from the sun); an anteater is brought in by an Indian.*







This canal carries water to rice fields on a Surinam plantation.

Surinam's main wealth comes, however, not from agriculture but from mining. The small land has very large deposits of bauxite near Paranam and Moengo. Find both these places on the map. The bauxite in Surinam is near the surface of the earth and is therefore mined by open pit methods. The ore is taken to deep rivers nearby and loaded onto ore ships to be transported to the United States or the Netherlands.

Most transportation in Surinam is on the rivers, but a railroad has been built from Paramaribo, the capital, to Dam. It was built to bypass the rapids on the rivers so that gold could be transported to the coast from inland areas. A highway is being built across the country near the coast, and an international airport has been built near Paramaribo. It is difficult to move goods from one part of the country to the other except near the coast.

**British Guiana.** British Guiana also has large deposits of bauxite, most of them located near Mackenzie. Most of the bauxite is exported to Canada, although some is sent to the United States and to countries in Europe. Some manganese is mined, and for many years the country has been a source of gold and diamonds.

About nine-tenths of the land is forested. On the inland savannas, especially along the Rupununi River, some cattle are raised.



These boats are docked at Paramaribo, Surinam's major port and only large city.

The cattlemen use fertilizers to improve the quality of the grass which grows on the land. The meat is flown to Georgetown and other centers along the coast where most of the people live. Rice is the main subsistence crop grown on the fertile coastal plain. Yams, citrus fruits, cacao, coffee, and sugar cane are also grown. Most of the sugar-cane plantations are located near Georgetown, and sugar usually is British Guiana's most valuable export.

### QUESTION BOX

23

1. What three European countries are politically connected with the Guianas?
2. Why do most of the people in the Guianas live along or near the coast?
3. What is most of the land like in the Guianas?
4. What is the main food crop grown in the Guianas? Why is it raised by methods common in southern Asia?
5. Why are temperatures fairly uniform throughout the year in the Guianas?
6. What are the most valuable exports of these countries?
7. What problems do the people of the Guianas face in developing a higher standard of living?



## VENEZUELA

North of the Guianas, with a coastline on the Caribbean Sea, is the country of Venezuela. Perhaps Venezuela should be called "Land of Petroleum" because it produces about one-eighth of the world's supply of crude oil. Venezuela is about one and one-half times larger than Texas. It has a population of almost eight million people, most of whom are mestizos. The population of Venezuela is growing very rapidly, both from natural causes and as a result of immigration.

**Early History.** Columbus discovered Venezuela in 1498 on his third voyage to the New World. He sailed along the coast as far east as the delta of the Orinoco River and completely circled the island of Trinidad. Later, other Spanish explorers sailed into Lake Maracaibo near the western border of the country. There, Indians had built their homes on **piles**, or long timbers, above the water near the shores of the lake. These villages reminded the explorers of the Italian city of Venice, and they named the land Venezuela which in English means *Little Venice*. The first permanent Spanish settlement in South America was made in 1522 where the city of Cumaná is now located.

During the second half of the 18th century, Venezuela had a period of rapid growth and prosperity. During this time, Venezuela was part of New Granada which, as you know, also included the present countries of Colombia, Ecuador, and Panama. By the early part of the 19th century, however, the people were objecting to Spanish rule. A movement for independence was started by Francisco Miranda, but his first attempts to achieve independence failed. Later, he joined forces with Simón Bolívar, who was born in Caracas, Venezuela, and together they led the battles which overthrew the rule of Spain. You

will remember that Bolívar then established the nation of Greater Colombia. Peace did not immediately follow, however. Spanish armies continued to fight for control of the land for many years until they finally were decisively defeated in the region which is now Ecuador. As you have already learned, Venezuela withdrew from Greater Colombia in 1830 to become free and independent. Since that time, there have been many revolutions against the government in Venezuela. At times the country has had good leadership and has made fine progress. Often, however, leaders have gained control of the country and used its resources for their own benefit.

The present government of Venezuela was established when the people revolted against a military dictatorship in 1953. A new constitution was adopted which provides for a president elected by the people for a term of five years. The Republic of Venezuela includes 20 states, two federal territories, a federal district, and a number of islands near the coast. Governors of the states are appointed by the president. The legislature consists of two houses, a Chamber of Deputies and a Senate. Members of the Chamber of Deputies are elected by the people, but members of the Senate are chosen by the state legislatures.

**Natural Regions.** There are four natural regions in Venezuela: (1) The mountainous region, which extends from the southwest border with Colombia northward to the coast and along the coast to the east; (2) The Lake Maracaibo Basin, or lowland in the northwestern corner of Venezuela; (3) The Llanos, or flat plains in the Orinoco Basin; (4) The Guiana Highlands in southeastern Venezuela.

**The Mountainous Region.** As the map on page 118 shows, the high Andes in northern Colombia divide into two major ranges. The western range continues northward in





Cacao beans must be sorted carefully before they are exported for processing.



Venezuela refines about 30 percent of the oil produced from its wells.

Colombia to the Caribbean Sea. The other range extends northeastward through Venezuela. Coastal mountains stretch on eastward as far as the Orinoco Delta.

The high range of the Andes in Venezuela is named the Cordillera de Mérida. Peaks in this range rise to an altitude of 16,400 feet, and are snow-covered all year. Although only about one-tenth of the land is in the mountainous region, about seven-tenths of the people live there. Most of the people live in valleys between the ranges at altitudes of 2,500 to 6,000 feet, where the climate is comfortable throughout the year. Farmers raise coffee, cacao, and other crops in the valleys and on the hillsides.

**The Maracaibo Basin.** Lake Maracaibo, the largest lake in South America, lies in a basin which is almost surrounded by the Andes Mountains. The climate is very hot and humid because the mountains block the cooling trade winds. Evaporation from the lake also adds to the humidity. Maracaibo, Venezuela's second largest city, is located on the western shore of the lake. Because of its location, Maracaibo has the highest average temperature of any city in South America.

Much of the land in the Maracaibo Basin is swampy, but the cultivable land is fertile. Cacao, sugar cane, rice, bananas, and coconuts are grown. However, the Maracaibo Basin is better known for its

*Left.* An oil-drilling site several miles from the shore of Lake Maracaibo.  
*Right.* One of South America's largest refineries at Lake Maracaibo.





petroleum resources that account for about two-thirds of Venezuela's total oil production. Most of the wells are east of the lake, but many are under the lake. To drill for underwater oil, huge wooden piles are driven into the lake floor. A platform is built on these piles, and an oil derrick is then built on the platform.

Lake Maracaibo, about 6,300 square miles in area, is connected to the Caribbean Sea by a long, narrow channel. This channel was dredged to make it deeper, so that oil tankers could steam through it when fully loaded. The oil industry has been largely responsible for Maracaibo's rapid population and industrial growth. Maracaibo is a major port city for the shipment of petroleum products. Many agricultural products from the highlands are taken to Maracaibo for shipment overseas.

**The Llanos.** Extensive tropical savannas are located on each side of the Orinoco River. This region is known as the Llanos. The grassy plains are used mainly for grazing cattle, and the number of cattle in Venezuela today almost equals the number of people. Large areas near the river are flooded during the rainy season. Because of the floods and long droughts which occur between rainy seasons, the Llanos is not one of the world's best regions for raising cattle. Moreover, the grass on the Llanos is not rich in food value so cattle raised there are usually thin.

Petroleum has been discovered in the eastern part of the Llanos and about one-third of Venezuela's petroleum now comes from that region. Few people, besides the cattle ranchers and workers in the oil fields, live in the Llanos.

**The Guiana Highlands.** About half the area of Venezuela is in the Guiana Highlands. As in the Guianas to the east, this highlands area contains both forested land and savanna land. It is almost uninhabited. For many years, gold and diamonds—two of Venezuela's valuable mineral exports—have been mined in the eastern part of the highlands. Most of the diamonds found in Venezuela are used in industry to cut hard materials, but they are rarely used in jewelry.

The most important mineral found in the highlands of Venezuela is iron ore. Two American steel companies have obtained rights from the Venezuelan government to mine the ore. Since the ore is located near the surface, open pit mining methods are used. One of the mines is at El Pao. Find El Pao on the map on page 118. In order to move the ore, a railroad was built from El Pao to a port on the Orinoco River. The ore was then shipped by barge down the river and loaded onto ocean-going ore ships. Another deposit of very high-grade ore, which was discovered later, is about 60 miles south of Ciudad Bolívar. The mine is shown on the map



A large amount of iron ore from Venezuela is now shipped to mills in the United States. In the future more of this ore may be smelted and used in Venezuela.







*Left.* Workmen gather salt crystals that have formed from sea water. *Right.* These cattle, raised in the Llanos, will be fattened before being sent to market.

as Cerro Bolívar. This huge deposit is believed to contain about half a billion tons of usable ore. A railroad was built from Cerro Bolívar to a port on the Orinoco River. Then, so that the ore from both mines would not have to be transported on barges, the river was dredged to provide a deep channel. Now, ocean-going ore ships can travel upriver to the ports at the end of each rail line. The ore ships take almost all of the ore to the United States.

**Angel Falls.** On the Caroní River, which flows from the Brazilian border northward to the Orinoco River, is a famous waterfall. The total drop of the Angel Falls is 3,212 feet. Angel Falls is believed to be the highest waterfall in the world. Someday, when roads are improved in this section of Venezuela, the falls may become a great tourist attraction.

**Manufacturing and Trade.** Venezuela, with its good supply of petroleum and iron ore, is making rapid progress in developing industries. For many years, almost all the petroleum was sent to the nearby islands of Aruba or Curaçao for refining. Today, a number of refineries in Venezuela refine some of the petroleum.

Major industries in Venezuela include food processing and making textiles and clothing. Automobiles are assembled and rubber tires are made for the automobiles.

Other factories make cement, paint, furniture, soap, shoes, and many other products needed by the people. A **petro-chemical** industry, which is a chemical industry based on petroleum, is also growing rapidly.

On the Orinoco River near Ciudad Bolívar, a steel mill using natural gas as the basic fuel also has been built. This area, known as Guayana region, is being planned as "the Ruhr of South America." A population of 250,000 is expected by 1970.

Many goods are imported to Venezuela, most of them purchased by profits from the sale of oil and iron ore. Most of the imports, such as automobiles, trucks, agricultural machinery, aluminum, and iron and steel products, are brought by ship to La Guaira, the main seaport for Caracas. Maracaibo and Puerto Cabello also are important centers of trade and commerce.

**Agricultural Products.** Although manufacturing is growing very rapidly in Venezuela, almost half of the people still make their living in agriculture. Until recently, most of the farmers used cut-burn methods of clearing hilly slopes, which caused rapid runoff of water and soil erosion. The farmers also used very simple hand tools and added little fertilizer to the soil. Many farmers still use such methods, but modern practices, including the use of farm machinery, are being adopted quite rapidly.



The principal exported agricultural products of Venezuela are coffee and cacao. The main food crops grown include corn, sugar cane, plantain, bananas, rice, and black beans. In the lowlands areas, citrus fruits, papayas, pineapples, and other tropical fruits are grown. In the high Andes, farmers raise potatoes and wheat on a subsistence basis. At present, products such as wheat flour, powdered whole milk, cheese, eggs, vegetable oils, butter, and oats are imported. The population has increased so rapidly in recent years that not enough of these foods can be produced in Venezuela. New dams have been constructed and, as a result, some land in the Llanos can now be irrigated during the dry seasons. Agricultural production may, therefore, rise considerably in the years ahead.

As in many other Latin American countries, much of the land in Venezuela has been owned by only a few people. Recently, the government has begun to provide opportunities for many farmers to buy land cheaply. Credit is given to the farmers so that they can pay for the land over a long period of time as they are farming it. Schools, homes, roads, hospitals, irrigation projects, and electric-power systems have been built in rural areas to encourage people to settle on fertile land. Agricultural research centers also have been established to increase the quantity of

agricultural products and improve the quality of those produced.

**Caracas and La Guaira.** Caracas, the capital of Venezuela, is the largest city in the country. It is located about ten miles from the Caribbean Sea at an altitude of almost 3,000 feet. Caracas is known all over the world for its beautiful, modern buildings. The city also has some slum sections, caused partly by the tremendous number of people who have recently moved from rural areas into the capital city. The government is trying to build good homes for these people, but it has not been able to keep up with the need for them. Caracas now has a population of about 1,400,000 and is the main financial and commercial center for Venezuela.

La Guaira, nearby, does not have a natural harbor, but a long breakwater has been built to make a good harbor for large ships. Can you remember any other cities in which man-made harbors have been constructed? La Guaira is connected to Caracas by a superhighway which has been built through the coastal range.

Two views of Caracas, a busy, modern city located in a valley behind the coastal range. At right is shown the business district. In the background are housing developments.







A modern highway connects Caracas with La Guaira, seven miles distant by air. La Guaira possesses one of the finest artificial harbors in South America.

**Transportation.** At the present time, Venezuela has a few railroads, most of them not connected into a single system. Plans are being made, however, to link all the major cities by rail.

By making use of its oil resources and an asphalt lake near the Gulf of Paria, Venezuela has developed a fairly good highway system. Many new roads are being built each year, and most of them are paved. Regular truck and bus service is provided between all the important towns and cities, most of which are located in the mountainous region. The Pan American Highway extends from the Colombian border to Caracas. A long bridge has been built across Lake Maracaibo to link Maracaibo with the highways east of the lake.

**The Future of Venezuela.** The people of Venezuela are trying to use the profits from sales of oil and iron ore to improve their standard of living. Many schools have been built and more children are receiving an education. Nevertheless, more rapid progress is needed. In recent years, inflation has been a serious problem. Many people still are miserably poor, and many children are receiving little if any education. The future for Venezuela, however, appears to be quite bright. Rapid progress probably will continue to be made, if stable democratic government can be maintained. Venezuela has more than

enough natural resources to aid the people in developing a high standard of living.

### QUESTION BOX

24

1. How was independence achieved in Venezuela?
2. What are the four natural regions of Venezuela? Which region has the warmest climate? Which has the coolest? Why?
3. What are the two main centers of petroleum production in Venezuela? Which place produces the greater amount of petroleum?
4. What kind of government does Venezuela have? How many states are in the country?
5. Why is the Llanos region not as good a grazing region as the plains of Brazil and Argentina?
6. What industries now established in Venezuela may cause a rapid growth in manufacturing?
7. What are the main agricultural exports of Venezuela? In what region of the country are they grown?
8. How is iron ore moved from the vast deposits in the Guiana Highlands to steel mills in the United States?
9. What is needed if Venezuela is to continue to make rapid progress toward a higher standard of living?



## COLOMBIA

Colombia, which was named for Columbus, is located west of Venezuela in the northwestern corner of the South American continent. Find it on the map on page 118. Its location, with seacoasts on both the Caribbean Sea and the Pacific Ocean, has been an advantage in the country's development.

**Brief History.** Columbus sailed along the northern coast of Colombia on his last voyage to the New World, but he did not land or explore the country. Alonso de Ojeda, an explorer who had been with Columbus on a previous voyage, actually discovered and explored the land. Ojeda returned to Spain with gold and pearls which he had obtained from the Indians. A number of Spaniards then started for the new land, hoping to obtain riches also.

The first permanent settlement in Colombia, Santa Marta, was not made until 1525. It still is one of Colombia's important ports. Santa Marta is located on the Caribbean Coast a short distance east of the mouth of the Magdalena River. Gradually, the colonists worked their way inland, conquering the Indians who fought fiercely for their land. In 1538, the Spanish founded Bogotá as the capital of the area.

Many Colombian farmers cultivate small fields on rocky hillsides with oxen and plows that are made of wood.

While Colombia was part of New Granada, there was much unrest. French, English, and Dutch buccaneers, attempting to gain riches quickly, often attacked the settlements along the coast. In time, though, Spain established firm control over the area.

In the late 18th century, signs of rebellion began to appear in the colony. The first actual revolt occurred in 1781, and several years of fighting between the armies of New Granada and Spain followed. Finally, in 1819, Simón Bolívar and Francisco de Santander, a Colombian by birth, led their armies over the Andes and the Spanish were decisively defeated.

After Venezuela and Ecuador withdrew from Greater Colombia, Colombia established its own independent government. "Republic of Colombia" became the official name of the country in 1886. Colombia has not been subjected to as many political revolutions as some neighboring lands in South America. The country was under a military dictatorship for a considerable period of time in the 20th century. A few years ago, a democratic form of government was re-established in Colombia.

**The People of Colombia.** Two different tribes of Indians were living in Colombia when the Spanish first arrived. Near the Caribbean Sea were the Caribs, a tribe which fought fiercely for its land. Inland, in the cooler mountain valleys, lived the Chibchas who were much more peaceful. The Chibchas farmed the fertile valleys, using agricultural practices which were quite advanced for those times.

Today, there are only a few Indians in Colombia. Most of them live in scattered settlements in the rain forests of eastern Colombia, where few other people live. More than half of the people now living in Colombia are mestizos with some Indian ancestry. Many other people have only European ancestors.





About 14¾ million people live in Colombia at present, about two-thirds of them making their living from agriculture. The population is growing very rapidly.

**The Regions of Colombia.** Colombia can be divided into three main regions: (1) coastal lowlands, (2) high mountains and plateaus, and (3) the eastern llanos and selvas. Most of the people live in the region of mountains and plateaus.

**Coastal Lowlands.** A glance at the rainfall map on page 41 will show you that this lowlands region along the Pacific Coast is one of the wettest parts of Latin America. This coast is one of the rainiest areas in the entire Western Hemisphere, receiving more than 150 inches of rainfall annually. Because of the latitude and altitude of the region, the climate is always hot and humid. Many of the people who live in this area are Negroes and quite a number of them raise cattle. Few people live on the coastal lowlands because of its unpleasant climate.

**High Mountains and Plateaus.** As the map on page 118 shows, three high ranges of the Andes extend northward across Colombia from its border with Ecuador. The western range, known as the Cordillera

Occidental, is the lowest of the three ranges. Between the Cordillera Occidental and the Cordillera Central flows the Cauca River. This river valley and the lower slopes of the mountains enclosing it form one of the most fertile farming areas in Colombia. This is the main region for growing coffee, Colombia's major export crop. Soils on the mountain slopes have been made rich by volcanic ash which has been deposited by volcanoes in the Cordillera Central. The highest of the three Andes ranges is the Cordillera Central, with peaks reaching to 18,000 feet. Many of the peaks are snow covered throughout the year. The area has two rainy seasons, one from March to May and the other from September to November.

The eastern of the three ranges is known as the Cordillera Oriental. Between the Cordillera Central and the Cordillera Oriental flows the Magdalena River, which is Colombia's Mississippi. The Magdalena Valley has only one rainy season, from May to October, and the rest of the year is fairly dry. Coffee is grown in the highlands area of the valley.

The Magdalena flows northward for a distance of about 962 miles. For almost two-thirds of this distance, the river is navigable by steamers. Throughout Colombia's history, the Magdalena has been the main transportation route from the coast to the highlands. As you can see by looking at the map, the Cauca River flows

In Colombia, cable cars such as these are often used to carry coffee beans from the mountainsides to river ports. There the coffee is loaded onto freighters.







*Left.* This island drilling site on the Magdalena River can be reached by river barge. *Above.* Two years were spent pushing a 35-mile-long road to a drilling site in the foothills of the Andes.

into the Magdalena River before the latter reaches the coast. The two rivers meet at a low, flat, swampy area which is often flooded during rainy seasons. The Cauca is not navigable throughout much of its length, and therefore has not been as important as the Magdalena in Colombia's development.

High plateaus are located between the mountain ranges. Bogotá, the capital city of Colombia, is located on one of these plateaus which is about 300 miles long and 150 miles wide. Since the altitude of Bogotá is about 8,600 feet, the climate is cool even though the city is located only a few degrees from the equator. In Colombia, differences in temperature depend primarily upon altitude. There are few seasonal changes except in the amount of rainfall. Around Bogotá, for instance, there are two rainy seasons and two drier ones during the year. October and November usually are the rainiest months.

**Eastern Llanos and Selvas.** Almost two-thirds of the land of Colombia is east of the Cordillera Oriental, yet very few people live there. As the map on page 118 shows, the northern part of eastern Colombia is drained by tributaries of the Orinoco River. Much of this region is grassland, similar to the Llanos in Venezuela.

By contrast, the southern part of eastern Colombia is drained by tributaries of the Amazon River, and is covered with rain forests called selvas. Some of the llanos region is used for grazing cattle, but as yet little use is made of the forested southeast. As the map shows, Colombia has a narrow panhandle stretching southward to the Amazon River at Leticia.

**Agriculture.** The products of Colombia's farmlands are as varied as the land itself. Orchids grow wild along the rainy west coast. The climates range from humid tropical to cool highland, making it possible for farmers to raise almost all kinds of fruits and vegetables.

As you have learned, coffee is Colombia's principal money crop. Colombia produces about one-sixth of the coffee grown in the world each year. Do you remember which country leads Colombia in coffee production? About one-fourth of the people of Colombia are employed in raising the coffee, processing it, or transporting it. Most of the coffee is raised on small farms rather than on large plantations such as those found in Brazil. It is a mild coffee which almost always brings high prices on coffee markets. Most of the coffee is marketed through a cooperative called The National Association of Coffee Growers.



Do you know what a cooperative is? It is an agency which handles business for its members and returns a share of the profits to its members. The quality of the coffee to be exported is controlled by the cooperative. The cooperative also stores coffee when prices are low and ships it when prices rise. This helps the Colombian farmers receive fairly stable prices for their most important money crop.

Near the northern coast of Colombia, the climate is hot and humid. Extensive banana plantations are located around the Gulf of Urabá and near Santa Marta. Other crops include sugar cane, corn, potatoes, rice, wheat, plantain, citrus fruits, sesame, and coconuts. Enough cotton and tobacco also are raised to meet the needs of the people of Colombia. On the high plateaus and mountain slopes, the main crops grown are wheat, potatoes, barley, corn, and beans. Most of the food crops are grown at altitudes below 6,000 feet in the two main river valleys. Production of rice, sesame, and cotton has risen in recent years because irrigation systems have been developed. These plants require more moisture than is provided by rain during the drier seasons.

**Animal Industries.** Raising cattle is the chief animal industry in Colombia, and it is growing rapidly. About one-fifth of the land is now in pastures. Most of the cattle

are raised in coastal areas at present, although the llanos probably will be used more extensively as transportation improves. Some meat and milk are flown regularly from coastal areas to highland cities, and some meat is exported to Great Britain. Hides and skins are also important exports. Many farmers raise pigs, sheep, goats, horses, and donkeys, but these animals usually provide only for family needs.

**Forestry.** Forests cover about two-thirds of the land of Colombia. Useful hardwoods may be found in the rain forests, but little timber is cut at the present. Can you tell why? Among the forest products obtained are rubber, gum, bark, roots, and nuts from which oil is pressed. As lumber resources elsewhere are used up and as roads are improved in Colombia, more use undoubtedly will be made of this valuable timber.

**Mineral Wealth.** Colombia has considerable mineral wealth. At the present time, petroleum is the most valuable mineral product, although the amount of exported petroleum is decreasing as the country's need for it increases. Nevertheless, Colombia exports more petroleum than any other South American country except its neighbor, Venezuela.

There are three main petroleum fields, two of them in or near the Magdalena Valley. One of the largest of the fields is near Barrancabermeja, which is located about

*Below.* Trucks loaded with supplies are ferried across a lake. *Right.* Helicopters are used in "commuting" between base camps and test-drilling sites by an oil company.







A gold mine in Colombia. Water under pressure is directed onto gold-bearing gravel.

halfway between Bogotá and Cartagena, the main port for exporting petroleum. Pipelines have been built from Barrancabermeja upstream to Bogotá and downstream to Cartagena. Pipelines have also been built from the other two petroleum fields to connect with these main lines.

Colombia also leads all other South American countries in mining gold. Most of the gold is mined by modern placer methods with large dredges, but some of it is obtained from veins underground. Platinum, also a valuable metal, is often found along with the gold, and some silver is also obtained from the same mines.

Northeast of Bogotá at Paz del Rio, good deposits of iron ore, coking coal, and limestone have been found. Since these are the

three main ingredients needed in making steel, as you know, a steel mill has been built in the area. Coal is found at several other places in Colombia as well. Most of the coal deposits, however, are far from the main centers of population.

**Manufacturing.** Manufacturing was slow to develop in Colombia, but now is developing quite rapidly. Most of the industries either process food or make clothing. The main products are textiles, food products, beverages, clothing, leather, and tobacco. A number of factories make steel products, chemicals and drugs, petroleum products, and cement. A fiber called *fiqua*, which is raised in Colombia, is used to make coffee bags and other articles in which a coarse cloth may be used.

**Transportation.** As you know, it is both difficult and expensive to build roads and railroads in mountainous areas. Nevertheless, a fairly extensive railroad network has been built through the highlands region in Colombia. Until recently, this system was not connected. The eastern network was located in the upper Magdalena Valley and on the high plateau around Bogotá. The western network extended westward and southward from Puerto Berrío on the Magdalena River. The two systems were recently connected by a railroad from La



These pictures show that Colombia is working to improve its transportation system. *Left.* Bridge building is difficult in the low, swampy areas. *Below.* Rails are being laid on a carefully prepared roadbed. It is fairly easy to lay track here.







*Above.* View of a busy street in Barranquilla. Note the modern buildings. *Right.* An aerial view of Bogotá, Colombia's capital city, which is located on a high plateau in the Andes Mountains.



Dorada to Puerto Berrío. Colombia now has, for the first time, a rail network which ties together its most populous regions.

Highways also are being built to speed the movement of goods and people from one section of Colombia to the other. Much of the coffee crop from the upper Cauca Valley is now trucked or taken by train through Cali to Buenaventura. The Pan American Highway extends from northwest of Medellín southward to Pasto and on to the border with Ecuador. Another branch of the highway extends eastward from Manizales to Bogotá and then northeastward to Cúcuta on the Venezuelan border.

Even with these recent improvements in road and rail transportation, the Magdalena River remains a major artery for transporting goods. A trip up the river from the coast to La Dorada takes the river steamers almost a week. The same distance can be covered by air in a little more than two hours. Air transportation has grown rapidly in Colombia ever since the first commercial airline in the Western Hemisphere was started there. There are now several airlines and approximately 200 different airports in the country. A number of international airlines serve Bogotá and Barranquilla. Few of the airports are located in eastern Colombia and still fewer roads have been built in that section.

**Leading Cities.** The leading agricultural and industrial cities of Colombia are Bogotá, Medellín, Cali, Barranquilla, and Manizales. In addition, Buenaventura, Santa Marta, and Cartagena are important seaports. Medellín and Bogotá are major centers for air transportation.

Although Bogotá and Medellín are the main industrial centers, Cali is the fastest-growing city at the present time. There are more factories in Medellín than in Bogotá, but the capital city has many government buildings and government workers. Bogotá is an interesting combination of the old and the new, as are many other South American capital cities. Many of the buildings were constructed more than a century ago. Those recently built are among the most modern to be found.

Medellín has become an important industrial center because it is located in a productive agricultural, grazing, and mining region. Its many factories include textile mills, food-processing plants, and metal-working shops. Furniture, chemicals, and drugs are also made there.

Barranquilla is the port located at the mouth of the Magdalena River. Until recently, most of Colombia's coffee was exported through Barranquilla. Now that a railroad has been completed from Cali to Buenaventura, about three-fourths of the coffee crop is exported through that port.





Cartagena has one of the best harbors on the north-east coast of South America. *Above.* Many different kinds of bananas are sold in this outdoor market in Cartagena.

**Government and Education.** The Republic of Colombia includes 16 departments, three territorial districts, and seven special districts. The people elect a president for a term of four years, but he cannot be elected for successive terms. Before 1954, only men could vote in Colombia; now, both men and women are encouraged to vote. The legislature in Colombia has two houses, a Senate and a Chamber of Representatives. Senators are elected for four-year terms, and Representatives for two-year terms. The President of Colombia has great power because he may suspend laws if he believes the country to be in a state of emergency.

All through the history of Colombia, the Roman Catholic Church has had much influence in government and education. Almost all Colombians are Catholics. Public elementary schools, which provide four years of schooling, are built and financed by the government. Religious education is compulsory in these schools. Some six-year public secondary schools have been built and are operated by the government. Most secondary schools, however, are operated by the Roman Catholic Church. A number of universities have been built in major cities, the largest of which is the National University in Bogotá.

## QUESTION BOX

25

1. What are the three main regions of Colombia? In which of these regions do most of the people live?
2. What different kinds of climate are found in Colombia?
3. What is the main money crop exported in large amounts from Colombia? Why does this crop usually bring high prices?
4. What river has been an important transportation artery all through Colombia's history? What is its main tributary?
5. What causes differences in temperature in Colombia? What seasonal changes are there?
6. Why can Colombian farmers raise almost any kind of crop?
7. Why do so few people live in eastern Colombia?
8. What is Colombia's most valuable mineral product? What other minerals that are important to industry does the country have?
9. What improvements in transportation have been made in recent years?
10. What are the main industrial cities of Colombia?



## GLOBE AND MAP ACTIVITIES

1. (a) Which nations in South America have some land in middle latitudes? (b) Which nations are entirely in low latitudes? (c) Is any of South America in high latitudes?

2. Referring only to the map on page 53, which shows the natural ground cover during summer months, sketch a rough rainfall map. Show the amount of rain which you believe falls on the continent of South America during the "summer" months (November 1 to April 30). When you have finished, compare your map with the rainfall maps on page 41.

3. Which of the following cities in South America have average temperatures in January of 80° or more: (a) Buenos Aires, Argentina? (b) Santiago, Chile? (c) Manaus, Brazil? (d) Quito, Ecuador? (e) Maracaibo, Venezuela? (f) Punta Arenas, Chile? (g) La Paz, Bolivia?

4. Which of the cities listed in Question 3 have average temperatures in July of 80° or more? Be ready to explain the differences.

5. Using the maps showing atmospheric pressures and prevailing winds on page 40, answer the following questions: (a) In which month does central South America have the lowest atmospheric pressure? (b) From what direction do prevailing winds blow across southern South America all during the year? (c) From what direction do prevailing winds blow along the Atlantic Coast between 20° South and 40° South? (d) From what direction do prevailing winds blow along the Pacific Coast north of 40° South? (e) What difference is there between prevailing winds in January and July along the northeastern coast of South America? (f) Would you expect more rainfall in January or July at the mouth of the Orinoco River? Why? (g) Would you expect more rainfall in January or July at Manaus, Brazil? Why? (h) Would you expect more rainfall in January or July at Punta Arenas, Chile? Why?

6. Project the population map of South America onto a large piece of paper. Then locate major cities, including all capital cities, on the large map. Add to the map, or show on separate charts beside it, the following information: (a) Countries of South America

arranged in order of size in land area; (b) Countries arranged in order of size of population; (c) Countries arranged in order of population per square mile. You may wish to include the figures used on the chart, or prepare a graph which shows comparative size, population, and population density. (The Appendix in the back of the book may be helpful.)

7. Project an outline map of South America onto a large piece of paper. Then draw symbols showing major mineral deposits on the map. Be sure to prepare a legend explaining the symbols you use. Be sure also to include petroleum as one of the minerals shown. When you have finished, you may wish to develop some generalizations about which countries are most likely to become major industrial nations.

8. Project an outline map of South America onto a large piece of paper. Draw the routes of major railroads and highways, including the Pan American Highway, on the map. You may then wish to develop some generalizations about transportation problems and needs in South America.

9. Paste a small outline map of South America onto tagboard or cardboard, and then cut it into separate countries. Do not label the countries in any way. Then: (a) Determine which country is the longer — Chile or Brazil; (b) Record how many seconds it takes you to place all the countries in their proper locations, starting from a scrambled stack; (c) See how many of the other countries fit onto the shape of Brazil.

10. Using a globe, indicate the time you think it would be in each of the following places when it is 12:00 noon in New York City: (a) Lima, Peru; (b) Santiago, Chile; (c) Buenos Aires, Argentina; (d) São Paulo, Brazil; (e) La Paz, Bolivia; (f) Cayenne, French Guiana; (g) Paramaribo, Surinam; (h) Georgetown, British Guiana; (i) Caracas, Venezuela; (j) Bogotá, Colombia. Then, using the time zones map on page 326, indicate the time it actually is at each of these places. How can you explain any differences between your estimates and the actual time?



11. Use the map on page 53 to answer the following questions. More than one right answer may be given to some of the questions, so be sure that you can justify the answers you give: (a) Which cities in South America have more than 2,000,000 people? (b) Which capital cities have fewer than 500,000 people? (c) If you wanted to start a cattle ranch in South America, where would you choose to buy land? (d) If you wanted to raise tropical fruits such as pineapples and bananas, where in South America would you choose to buy land? (e) If you wanted to start a sheep ranch primarily to obtain wool, where would you choose to buy land? (f) If you wanted to climb the highest mountain in South America, where would you go? (g) If you wanted to take the longest possible river journey in South America, where would you start your journey? (h) If you wanted to gather wild rubber from the rain forest, where would you go? (i) Is any of South America north of 10° North? (j) Is any of South America south of 60° South? (You will find that the climate and rainfall maps will also be helpful in justifying some of your answers.)

12. Be prepared to locate on a wall map the following areas in South America: (a) Patagonia; (b) Llanos; (c) Brazilian Highlands; (d) Andes; (e) El Gran Chaco; (f) Selvas; (g) Pampa; (h) Guiana Highlands; (i) Altiplano.

13. Be prepared to locate on a wall map each of the following rivers and lakes in South America: (a) Amazon; (b) Plata; (c) Orinoco; (d) Uruguay; (e) Paraná; (f) Paraguay; (g) São Francisco; (h) Pará; (i) Magdalena; (j) Titicaca; (k) Poopó; (l) Maracaibo.

14. Using any of the maps in the book, compute as accurately as possible: (a) The distance of a steamship journey around South America and through the Panama Canal; (b) The distance across South America from Barranquilla to Puerto Williams; (c) The distance across South America from Recife to Guayaquil; (d) The distance from the spot farthest inland to the coast on the continent. Then compute comparable distances for North America using St. John's and Nome or St. John's and San Francisco, whichever is longer, and Barrow and Panama. How do the distances compare?

## OTHER LEARNING ACTIVITIES

1. Form groups to do additional research on ways of living in each of the South American countries. Use encyclopedias, other textbooks, and popular magazines to help you find information. You may wish to use the following questions as a guide: (a) In what kinds of homes do people live, both in cities and in rural areas? (b) What is a school day like for pupils of our age? (c) Who are the national heroes and what are the special national holidays? (d) What are the favorite kinds of recreation both on weekends and on special holidays? (e) What occupations do men and women have both in cities and in rural areas? (f) What standard of living is common throughout the country? Prepare other questions for which your group may find answers.

2. Prepare a written report on one of the following people, and be prepared to present the highlights of the person's life to the class

in an oral report: Pedro E. Aramburu, Manuel Belgrano, Luis M. Drago, Francisco Hernández Girón, Bernardo A. Houssay, Juan D. Perón, Carlos Saavedra Lamas, José de San Martín, José B. de Andrada e Silva, Pedro A. Cabral, Juscelino Kubitschek, Oscar Niemeyer, Pedro I and II, Cândido Portinari, Alberto Santos-Dumont, Bidú Sayão, Getulio D. Vargas, Heitor Villa-Lobos, Claudio Arrau, Carlos Ibáñez, Gabriela Mistral, Bernardo O'Higgins, Francisco de Paula Santander, Atahualpa, Ramón Castilla, Francisco Pizarro, José G. Artigas, José Batlle y Ordóñez, Simón Bolívar.

3. Select several of the major crops grown in South America, such as coffee, corn, cotton, yerba maté, cacao, bananas, and find out how much of each crop is exported from the country in which it is grown. Make charts, ranking the countries according to the amounts of the major crops which are exported.



4. Write an imaginary story about an historical event or about people living somewhere in South America today. Include as much detail as is needed to help your readers understand the setting, but be sure to keep the story moving. Your story may be based on a real event or it may be entirely fictional.

5. Prepare a summary sheet (not more than one page) giving basic facts and generalizations drawn from those facts about each country in South America. You may want to include in your summary information such as: (a) Comparison of the land area of the country with a familiar area; (b) Total population and population distribution; (c) Major regions; (d) Language; (e) Major cities and why they are well known; (f) Major crops and regions where they are grown; (g) Major rivers and lakes; (h) Major problems and probable future. If you have space on your summary sheet, add to it anything else which you think is important.

6. Use pictures in this book, other textbooks, and magazines as the basis for a report on architecture in South America. You may wish to show the pictures to the class using the opaque projector. A vivid contrast between the architecture of Spanish days and that of recent years should be apparent.

7. Undertake a research report on one of the following subjects: (a) The Inca civilization — its glories and its downfall; (b) Differences between the Spanish and Portuguese languages; (c) The foreign policy of the U.S.A. toward South American countries; (d) The Pan American Union and the Organization of American States; (e) The Latin America Free Trade Association; (f) Past wars between the countries of South America — causes and results; (g) Brasília, a new capital city for South America's largest country; (h) Revolutions in South America in recent years — causes and results; (i) The world's largest river; (j) Llamas and alpacas; (k) Gauchos — their work and their way of life; (l) Indian tribes of South America, other than the Incas; (m) The effects on climate of ocean currents, mountain ranges, and prevailing winds; (n) Should the Guianas be independent? — arguments for and against.

8. Interview a person who is a native of a South American country, or has lived several years in one. Attempt to gain additional information about the people's ways of living and about recent developments in the country.

9. Join a group to preview all films and filmstrips on South American countries which are available in the school's audio-visual library. Choose the ones which seem to provide the information most wanted and needed by the class, and make plans with the teacher to show them.

10. Join a committee to locate all the magazine articles on South America published during the last year. First, you will need to ask class members to look for them at home, and you should visit the library to see what magazines are available. Look in the *Reader's Guide to Periodical Literature* under headings such as South America, Latin America, and the individual countries, and make a master list of articles in those magazines which are available. Select from all these articles the ones which seem to be of greatest importance and interest. Plan a reading-table exhibit of the articles. You may wish to prepare a bibliography or card catalog for use by pupils who are not members of your committee.

11. Join a group to write letters requesting information about South America to airlines, steamship companies, travel bureaus, embassies of the various countries, the United Nations, business firms which control South American factories or mines, and companies which import large amounts of agricultural products such as coffee and bananas.

12. Make a collection of different map projections showing South America. Display the maps, or project them using the opaque projector, for class members to see. Be prepared to explain how each projection is made (see encyclopedias and atlases for explanations) and the advantages and limitations of each. Also include in your display maps having the same projection but giving different kinds of information. An example of this is an equal-area, physical-political map which shows the altitude of the land by color. This kind of map does not show, therefore, natural vegetation features.









# CENTRAL AMERICA

Between Mexico and Colombia are six small republics and a British colony which form an area called Central America. This land was discovered by explorers from Spain, and was settled and ruled by the Spanish for about 300 years.

**Early History of Central America.** Before the Spanish came, much of Central America was inhabited by the Mayan Indians. The Mayas were primarily farmers. Because of their interest in agriculture and in determining the best time of year to plant crops, they became very interested in astronomy. Almost 1,000 years before the Spanish came, the Mayas had invented a calendar and a number system which included the zero. These Indians made art and jewelry of high quality and developed a distinctive architecture for their temples and public buildings.

Panama is now one of the republics of Central America. During the early days of Spanish rule, however, Panama was part of New Granada. The rest of the land of Central America, during the colonial period, was a single Spanish colony called Guatemala. In 1821, the colonists in Central America and Mexico declared their

independence from Spain. The Central American nationalists then formed the states of Costa Rica, El Salvador, Guatemala, Honduras, and Nicaragua. In 1822, these Central American states joined the Mexican Empire. The following year, they withdrew from Mexico and formed their own nation, the Republic of the United Provinces of Central America. This union lasted until 1838 when the states withdrew and formed independent republics. Guatemala claims the land which is shown on the map as British Honduras. This portion of Central America is still a colony of Great Britain, however. Panama became an independent republic in 1903.

**The Land of Central America.** As the map on page 143 shows, Central America is long and narrow. Nowhere is the distance from the Caribbean Sea to the Pacific Ocean more than 350 miles. All the countries, except El Salvador and British Honduras, have coasts on both the Caribbean Sea and the Pacific Ocean.

The map on page 143 shows that most of Central America is mountainous. Ranges extend from southern Mexico about a thousand miles to Colombia in South

The Panama Canal shortened the ship  
 ◀ route from New York to San Francisco  
 by 5,000 miles.





*Above.* Lava and ashes spew forth from an active volcano in Nicaragua. *Left.* View of a thriving dairy farm on the slopes of a volcano in Costa Rica. Lava and ashes from volcanic eruptions helped to make this land fertile.

America. The ranges are separated by lowlands in a few places, and there are high plateaus between the ranges. This backbone of Central America is part of the great Cordilleran system which extends from Alaska to southern Chile. Many of the mountain peaks are or were active volcanoes. Much of the land has been built up and made fertile by volcanic ash and lava. Earthquakes occur frequently in Central America, sometimes destroying much property. As the map shows, the mountain system is closer to the Pacific Ocean than the Caribbean Sea. Consequently, the western slopes of the western

ranges usually are steeper than the eastern slopes.

Coastal lowlands are found along both coasts of Central America, but the western coastal lowlands are much narrower than the eastern lowlands. There are only three lowland areas of considerable size. One of these, called the Nicaraguan Depression, extends southeastward from the Lempa River in El Salvador. It includes the Gulf of Fonseca, Lakes Managua and Nicaragua, and the valley of the San Juan River. Another lowland area extends northward from Bluefields on the eastern coast of Nicaragua. It is called the Mosquito Coast,

View of a lowland area close to the Mosquito Coast. Average rainfall in this area is more than eighty inches each year.





named for a tribe of Indians which still lives in that area. The third lowland area, which includes much swampland, is found in northern Guatemala and British Honduras. This section of Guatemala is known as El Petén.

**The Climate.** The maps on page 40 show that prevailing winds blow toward the Caribbean Coast of Central America throughout the year. These winds bring heavy rainfall to sections near the eastern coast. Many areas have more than 100 inches of rain annually.

All during the year, the lowlands of Central America are warm and humid. Most sections of the western lowlands, however, have a drier season lasting from four to six months. Much less rain falls there from November 1 to April 30 than during the other six months of the year.

As in northern South America, temperatures throughout Central America depend largely upon altitude. In the lowlands, the temperature is high every day of the year. In the highlands, temperatures are lower and more pleasant. Near the high mountain peaks, the temperature drops sharply as soon as the sun sets, so that nights are quite cold.

**Forests and Grassland.** Practically all of the land in Central America is covered with forests or is grassland. Tropical rain forests along the humid Caribbean Coast contain various kinds of hardwood trees, such as mahogany, rosewood, and cedar. Pine and oak forests are found north of the Nicaraguan Depression. Patches of grassland may be found scattered in the lowlands area, but more savannas are located on the western mountain slopes and coastal plains.

Because of the difficulty of removing trees from rain forests, most of the lumbering operations are near the rivers. Several forest products are exported from Central American countries, nevertheless, the



Trees and tropical shrubs are knocked down by a tractor that is clearing land for a new banana plantation.

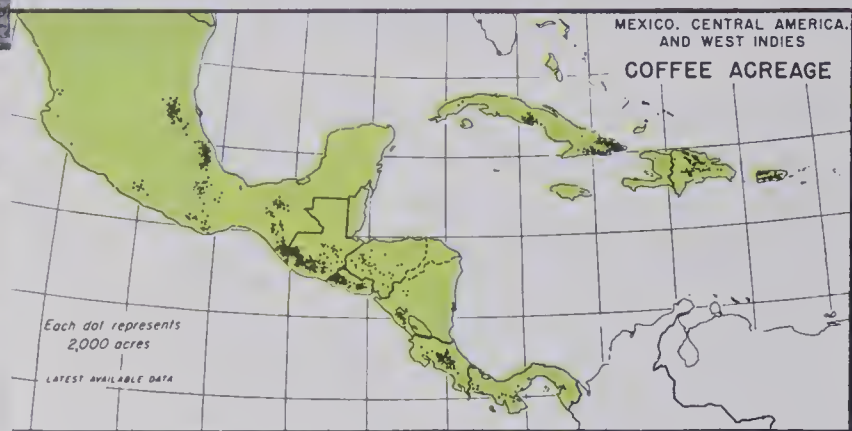
most important of which is chicle. Chicle is a gum obtained from the sap of the Sapota tree and is used as the base for chewing gum. Nearly all of the world's supply of chicle is gathered in Central America.

**Agriculture.** Although very little land in Central America is cultivated, the occupation of most of the people is farming. More than half of the income received from trade by the Central American nations comes from the sale of agricultural products. In several of the countries, more than nine-tenths of the national income is received from the sale of crops. The main crops

A cargo of mahogany logs is taken on board a freighter at Bluefields, Nicaragua.







The map shows coffee-producing areas in Central America. Coffee growers here produce a coffee noted for its mild flavor and aroma. The rich volcanic soil in many upland areas is ideal for raising coffee trees.

Stems of recently-picked bananas are being transferred from a river barge to an ocean-going ship. Do you remember why the bananas are picked when they are green?



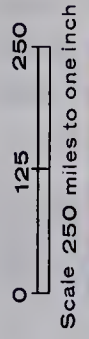
exported in large amounts are coffee, bananas, and cotton. Other exported agricultural products include raw sugar extracted from sugar cane, sesame seeds, rice, and fibers obtained from several different plants.

The most valuable of all the agricultural exports is coffee. About one-tenth of the world's supply of coffee comes from Central America, with Guatemala and El Salvador producing the greatest amount. The coffee is mild and of high quality. It is raised mostly on the Pacific slopes of the northern highlands where the soil has been enriched by volcanic ash. Most of the coffee is grown at altitudes between 2,000 and 5,000 feet. There are some large coffee plantations, but much of the coffee crop is raised on small farms.

The second most valuable crop is bananas. At one time, most of the bananas were raised on large plantations along the Caribbean Coast. Most of these plantations were established and operated by the United Fruit Company of the United States. The plantations were started in areas that were practically uninhabited. Large areas of land had to be cleared, swamps had to be drained, and roads, railroads, and ports were built. Homes, hospitals, and schools were also constructed for the workers and their families. The plantations were very productive until a disease, known as Panama disease, attacked the banana plants. As a result, most of the plantations along the Caribbean Coast are no longer major banana producers. Other crops are now grown on that land. New banana plantations have been started on the drier west coast where the Panama disease does not affect the banana plants. Because less rain falls on the Pacific Coast, irrigation frequently is needed during the dry season for the plants to grow well. Guatemala, Costa Rica, and Panama now are main centers of banana production.



# AND THE WEST INDIES



MOUNTAINS



TROPICAL RAIN FORESTS



FARMLAND

Lambert Azimuthal  
Equal-area Projection







Cotton is the third most valuable agricultural export of Central America, and it is the leading export of Nicaragua. Much cotton is grown in El Salvador and Guatemala, also. Most of this valuable fiber crop is grown in central valleys or on the Pacific coastal plains. Most cotton farmers in Central America use modern agricultural methods. They test the soil and add the fertilizers which it needs. They use tractors and cultivators to plant the seed and till the soil. Using modern spraying machines or airplanes, they spray the cotton plants and they harvest the crop with mechanical cotton pickers. Crop yields are high, and the quality of the cotton is good.

Most of the farmers in Central America, however, do not raise commercial crops for sale. They use simple tools, including hoes, machetes, and ox-drawn plows, to till the soil and harvest the crops. They use seeds of poor quality and little or no fertilizer. As a result, they are able to raise only enough food for their families and perhaps a little more to trade for goods they need. The main crop raised by such farmers is maize, which is a poor-quality corn. Other food crops are manioc, beans, yams and other vegetables, wheat, and rice. Many of the farmers keep a few cows, hogs, chickens, and sheep.

In many remote villages in Central America, the people live much as they did

Cotton production has increased greatly in Nicaragua, El Salvador, and Guatemala during the past ten years. Only a few farmers still have their fields picked by hand. *Below.* A government agent in Costa Rica is checking the health of these calves for a farmer.



several hundred years ago. Goods are bartered at the market place. In some villages, the total crop yield is placed in a central storehouse and shared by all of the people in the village.

Since the days of Spanish occupation, much of the grassland of Central America has been used for grazing cattle. Through the years, the farmers have added very little fertilizer to the soil and, until recently, have done little to improve their breeds of stock. As a result, Central American meat and dairy products generally are of low quality and limited quantity. For a number of years, farmers in Costa Rica have been developing good dairy herds, however, and their meat and dairy products are of higher quality.

**Mineral Products.** Few valuable mineral deposits have been found in any of the Central American countries. Some exploration for petroleum is being done at the present time in the hope that a large quantity of this valuable resource will be found.



Some gold and silver are mined in Honduras and Nicaragua, and some lead in Guatemala. Only a few people work in the mines, and mineral products contribute little to the national income.

**Manufacturing.** At present, there are few industries in Central American countries. El Salvador leads the other republics in manufacturing, and Honduras has the fewest plants. Most factories process agricultural products, including coffee, sugar, cotton, leather, and wood. There are some cement mills, cigarette factories, textile mills, and beverage plants.

Manufacturing has been slow to develop in Central America for a number of reasons. These include: (1) lack of mineral fuels and other power sources; (2) lack of markets within the countries; (3) lack of good transportation facilities in each country as well as among the countries; (4) lack of education among the people generally.

**Transportation.** Central America's development has been closely tied to development of a transportation system. Soon

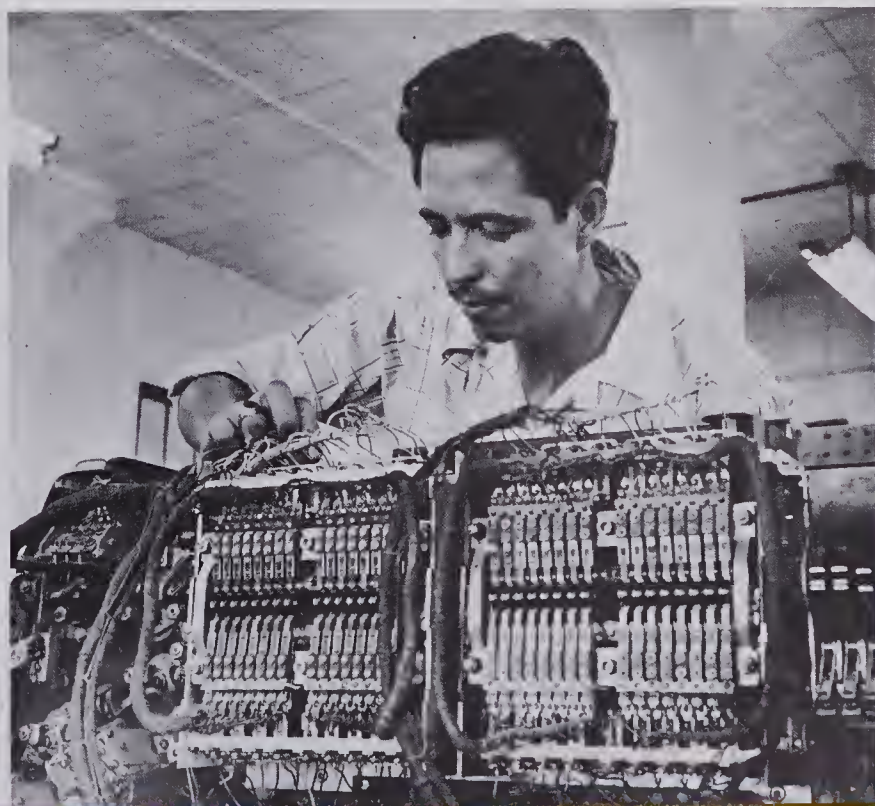
after the Spanish conquest, a narrow road was built across the Isthmus of Panama. The Spanish transported gold and silver obtained from the Incas in South America over this road to ships on the Caribbean Coast. Men dreamed of the day when a canal would be constructed so that ships could move from one ocean to the other. Several possible routes for canals across Central America exist, but to date only the Panama Canal has been constructed.

Other means of transportation in Central America have been slow to develop. The six republics and one colony are not connected by a rail system. In fact, only three of the republics, Guatemala, Costa Rica, and Panama, have rail lines crossing the isthmus from one ocean to the other. Most railroads have been built by private companies and the lines in most instances, even within a single country, are not joined together. Many of them extend from ports only a short distance inland to agricultural areas or to the capital city.

Many areas of Central America do not have highways. The Pan American Highway has been completed except for a section joining Panama and Colombia. El Salvador, the smallest of the twenty-one republics in the Americas, is the only country in Central America which has a well-developed road system.



*Above.* Parts of a derrick are being riveted and welded at a Nicaraguan gold mine. The parts were shipped from the United States and assembled at the mine. *Right.* This worker in an office of the United Fruit Company in Honduras is repairing an office machine.







This railroad under construction will serve new banana farms in Guatemala. Can you see why it is difficult to lay track through a region such as this? What kind of forest is shown?

Many Central American towns and cities which do not have rail or truck service are served by airplanes. Although major international airports are located only in or near capital cities, many other cities and towns have fields where small aircraft may

land. Thus, people who have never seen a train, truck, or automobile may see or ride in small airplanes!

Until good highways and railroads are completed in Central America, progress toward a higher standard of living for the people will be delayed. For that reason, most of the countries are spending considerable sums of money to improve their transportation systems. The United States government is helping by providing some of the needed money, as well as men and machines.

**Education.** In the past, only children of wealthy people in Central American countries were educated. Other children had few or limited opportunities for education. This situation has changed in recent years, and now all children are required by law to attend school. Many of the schools, however, are operating with limited supplies, few books, and large classes. As a result, many of the children who attend school do not receive a good education. Secondary schools and colleges have been opened and many adults who were once illiterate have been taught to read and write.

**A Region of Rapid Change.** Throughout Central America, the common man is demanding a higher standard of living, and living conditions are changing rapidly for



The young man shown lecturing to a chemistry class is a recent graduate who has returned to teach in Honduras.





The Nicaraguan government is encouraging the cultivation of oil palm trees as a cash crop. Technicians test a tree for its seed value.



The picture above shows a Costa Rican family at a market. Many people in Costa Rica enjoy a fairly high standard of living.

the better. A major question, however, is whether changes will be rapid enough to prevent the people from adopting methods of change offered by totalitarian communism. The countries will have to make very rapid progress, or their standard of living will fall rather than improve. Cities in Central America, already overcrowded, are growing very rapidly. The region has one of the highest rates of population growth in the world. Most of the countries suffer from unemployment and inflation. Most of the wealth is in the hands of a few people who often do not wish to invest their wealth in new industries which are needed.

A solid, stable middle class is growing, nevertheless, and as educational levels are raised, the number of people in this class will probably increase. Governments are trying to encourage people from other lands to invest money in new plants. Roads are being built to isolated areas, and new farming methods are being adopted. Recently, all the Central American republics except Panama signed the General Treaty for Central American Economic Integration to lower tariffs and increase trade. A regional banking system has been started, and plans are being made to increase industry and improve transportation.

## QUESTION BOX

26

1. What was the Republic of the United Provinces of Central America? What land area did it contain?
2. What is the farthest distance from ocean to ocean in Central America?
3. Where in Central America would you buy land if you wanted to start a coffee plantation? Why? (Give several reasons.)
4. Where are the three large lowland areas in Central America, and what are they called?
5. What grows on most of the land of Central America?
6. What are the main agricultural exports of Central America?
7. Why have most of the banana plantations in Central America been moved from the Caribbean Coast to the Pacific Coast?
8. Where is most of the coffee grown?
9. Where is most of the cotton grown?
10. Why do you think Communists are able to convince some people in Central America that their way of life is better than democracy?
11. What problems do the Central American countries face in attempting to raise the standard of living?



## PANAMA

The most southern of the Central American republics is the little country of Panama. About the size of Indiana, it has a population of more than a million people. Throughout the history of the Western Hemisphere, Panama has been important because it is the narrowest land separating the Atlantic and Pacific Oceans. As you have learned, Panama was included in the Spanish colony of New Granada during its early history. It also became part of Greater Colombia, and remained a province of Colombia until 1903. Later, we shall learn more about the circumstances under which Panama became independent.

**The Land and Climate.** Two mountain ranges stretch end to end across Panama from the border with Colombia to the Costa Rican border. Most of the peaks are from 3,000 to 8,000 feet high except near the Costa Rican border where a few peaks are more than 11,000 feet high. Most of the land, as the map on page 143 shows, is covered with tropical rain forests. There are some areas of tropical savanna near the Pacific Coast.

The climate in Panama is warm throughout the year. From May to December, some rain falls almost every day. From January to April much less rain falls, so these months are known as the dry season. As in other Central American countries, much more rain falls on the Caribbean Coast than along the Pacific Coast of the Isthmus.

**The People and Their Government.** Most of the people of Panama are mestizos who speak Spanish. In isolated rural areas, some Indians live much as they did when Balboa worked his way across the isthmus to discover the Pacific Ocean in 1513. Some Indians living on islands near the coast have changed their ways of living only slightly down through the years.

Included in the Republic of Panama are

nine provinces and the San Blas Islands off the Caribbean Coast. The president of the republic is elected for a four-year term, and may not be re-elected until two more terms have passed. Two vice-presidents and the members of the National Assembly are also elected for four years. Governors of the provinces are appointed by the president.

Most citizens in Panama are members of the Roman Catholic Church, and freedom of religion is guaranteed to all citizens. Most citizens of Panama have received an education, because all children between the ages of seven and fifteen are required to go to school.

**Occupations.** The Panama Canal is located in a ten-mile-wide strip of land called the Canal Zone, which is leased to the United States. Many people in Panama live near the Canal Zone and make their living in trade or transportation. Most of the rest of the people live north of the Canal Zone on the Pacific side of the Isthmus. Many of them farm or raise cattle. On large plantations, particularly inland from David, bananas, abacá, and cacao are raised as cash crops. Many farmers raise other crops, including rice, sugar cane, corn,

Many farmers in Panama live in one-story thatch-roof dwellings such as the ones along this village street.





beans, potatoes, cotton, pineapples, mangoes, and citrus fruits, for their own use or for sale. Coffee is also grown on the mountain slopes.

Bananas are the most valuable export of Panama. The second most valuable export is shrimp, which are caught in large amounts in the waters close to this narrow land. Many other seafoods, including red snapper, Spanish mackerel, pompano, and tuna, are caught by fishermen.

There is some lumbering in the tropical rain forests. Mahogany and Spanish cedar are the woods most frequently cut and exported.

Not much manufacturing is done in Panama. Foods and beverages are processed in small plants, and plywood, cement, tobacco, and clay products also are made. Of these products, only cement and plywood are exported in significant amounts.

**The Panama Canal.** Before gold was discovered in California in 1849, the only way to cross Panama was on an ancient trail. During the Gold Rush, many United States citizens went by ship to the east coast of Panama, and then rode horses across the isthmus to the Pacific Coast. There they boarded other ships which sailed up the west coast of North America to California. In 1855, a railroad was built across the

isthmus between Colón and Panama City. More people and a greater amount of goods could then be moved more easily and rapidly across this narrow neck of land.

Almost from the time of the first European explorers, men dreamed of connecting the two oceans by a canal. Finally in 1882, a French company headed by de Lesseps, who had built the Suez Canal, started construction of a canal across the Isthmus. After several years, the French company ran out of money and stopped its work. Diseases, particularly malaria and yellow fever, had been partly responsible for the slow progress made by the French.

In 1902, the United States agreed to pay \$40,000,000 to the French company for its rights to build a canal across the isthmus. Colombia, of which Panama was then a province, was offered \$10,000,000 plus an additional \$250,000 each year for a ten-mile-wide strip of land. The Colombian legislature, however, would not approve the lease of the land to the United States. The French company wanted very much to sell its rights to the canal, and some businessmen in Panama were eager to have the canal built there. With encouragement from both France and the United States, the citizens of Panama declared their independence from Colombia in 1903.

A small, family-run tile factory in Panama. In the center foreground is a crude kiln where molded clay is "fired" or heated for several days.



Sugar cane is processed in this small refinery near David, Panama. Can you tell what is used for fuel in this mill?







*Top left.* View of Miraflores lower lock under construction in 1913. The lock walls are 82 feet high and the lock gates 7 feet thick. *Middle left.* An aerial view of the locks at Gatun. Ships must be raised 85 feet before entering Gatun Lake in the background. *Bottom left.* A map of the Canal Zone. *Below.* No large vessel operates under its own power when passing through locks. This vessel, bound for the Pacific, is being lowered in the locks at Miraflores. *Bottom right.* Ships are towed through the locks at an average speed of two miles per hour by electrically powered locomotives called "mules."





Building the Panama Canal was a great feat of engineering. It was completed in 1914, and has been used ever since. The canal was difficult to build partly because the route led through some high hills. A dam was built on the Chagres River to form Gatun Lake near the center of the isthmus. Since this lake is 85 feet above sea level, locks are used to raise ships to the lake and lower them again to sea level. The locks are 110 feet wide, and the channel in the canal is at least 41 feet deep. The canal is a little more than 50 miles in length. Most ships travel from one coast to the other in about thirteen hours.

The canal was successfully completed largely because malaria and yellow fever were conquered. Progress in controlling the mosquitoes which spread both diseases has made Panama a healthy place in which to live.

More than 9,000 commercial ships a year pass through the canal, all of them paying a toll for its use. U.S. warships also use the canal to move from one ocean to the other. Some consideration is being given to building another canal across Central America because the Panama Canal is handling about as many ships as it can. Moreover, some very large ships have difficulty going through the canal because of their great size. Two steps are being taken to speed the flow of traffic: (1) excavated portions of the canal are being widened, and fluorescent lights are being placed along the cuts; (2) more powerful engines are being installed to pull the ships into the locks. When the channel has been widened and the lights installed, the ships will be able to move safely through excavated parts of the canal all through the night. When the new engines are installed, there will be fewer delays at the locks.

The United States pays the Republic of Panama \$1,930,000 a year for use of the Canal Zone. This land is not owned by

the United States, but is leased or rented from the Republic of Panama. In recent years, some tension has developed between the two governments about the Canal Zone. Panama wants a higher rental payment for the Canal Zone, and has insisted that the Panamanian flag as well as the United States flag be flown over the territory. Unless relations with Panama improve in the coming years, another canal may be started across southern Nicaragua. The United States has purchased rights to build a canal in this area. Several other possible canal routes exist across the narrow portions of Central America, including several in Panama and Colombia. Use of nuclear energy to excavate the new canal is being considered. The hope is that a sea level route like the Suez Canal can be developed so that locks will not have to be used.

**Panama's Future.** In recent years, the people of Panama have had a higher standard of living than is found in many other Latin American countries. This situation exists because the canal draws many tourists to Colón and Panama City, the two principal cities. Money spent by tourists is an important source of income. Many United States citizens also live in the Canal Zone and spend money in Panama. The money received from the United States government for lease of the Canal Zone also helps the Panamanian government.

Attempts are being made by the government to improve agricultural practices and raise the standard of living. A high standard of health has now been achieved and most children are receiving an education. Better use of natural resources probably will be made in the future. As yet, there are few known mineral resources, but much fertile land still has not been brought under cultivation. Panama's future, however, will undoubtedly be closely tied to world transportation and trade.





The wheels of this oxcart are gaily painted. Oxen are commonly used as work animals in many countries of Central America.



Coffee trees from several countries are being compared at an agricultural research center. Such experiments may help improve crop yields.

## COSTA RICA

Costa Rica is about the size of West Virginia and has about 1½ million people. Most Costa Ricans are of European ancestry, and most can read and write. Only a few Costa Ricans are mestizos or Indians.

The Spanish name, Costa Rica, means *Rich Coast* in English. The land was given this name by early Spanish explorers who hoped to find gold in the country. Although some gold and silver are mined today, minerals have never been of importance to the economy. The main exports are coffee, bananas, cacao, and abaca.

Many Costa Ricans live on the Central Plateau where San José, the capital, is located. San José is located in a coffee-growing and dairy region and is the main center for commerce for the country. Since August, 1962, Mt. Irazu, a volcano about 25 miles from San José, has been throwing smoke and ashes into the air. Many farmers living nearby have had to move. If the ashes continue to fall on San José as they have for two years, it may have to be moved.

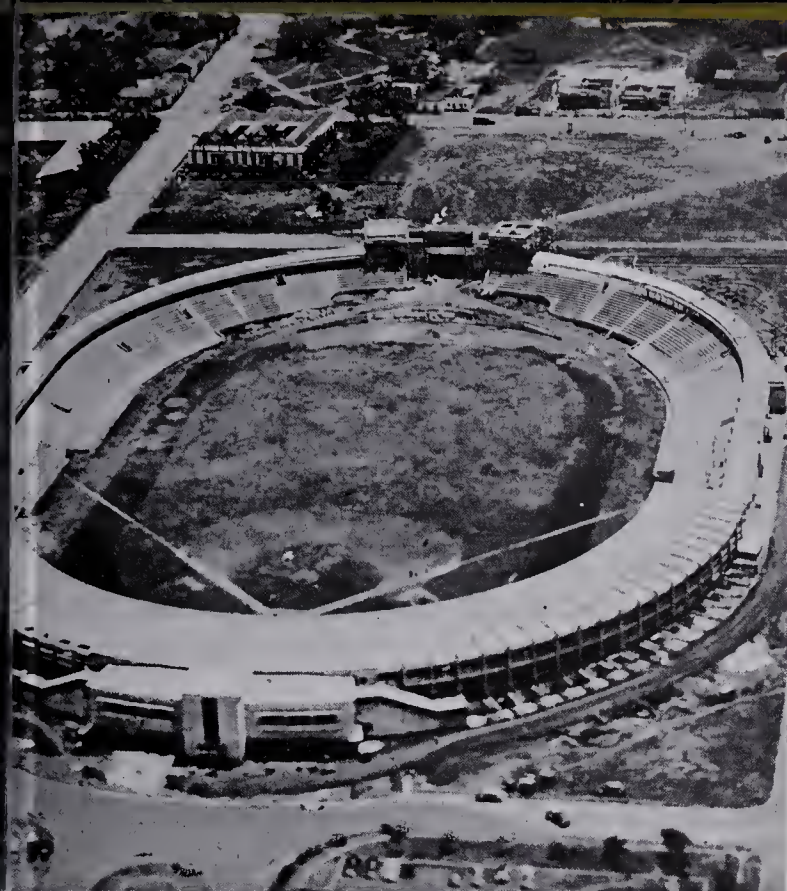
Cartago, located nearby, is the second city in commercial importance. Farmers near Cartago raise dairy cattle and grow food crops for sale in the cities. Alajuela, a few miles west of San José, is the location of the country's international airport. Alajuela is also an important center for raising cattle and sugar cane.

Most farmers who live on the Central Plateau own their farms. You will remember that the Costa Rican dairy farmers have developed fine herds. Large banana plantations have been established along the Pacific Coast by the United Fruit Company.

The University of Costa Rica has a school of agriculture which, through experimental and research work, is helping farmers improve agricultural methods. The OAS has also established the Inter-American Institute of Agricultural Sciences in Costa Rica. This institute is a center of agricultural research and experimentation.

Government in Costa Rica is fairly stable. There has not been a revolution since 1948.





View of the large stadium in Managua, Nicaragua's capital city. Managua is one of the more modern small cities in Latin America.



Only a few people live in clearings in the rain forests that line the banks of the San Juan River. Can you tell why?

## NICARAGUA

Nicaragua is the largest of the Central American republics. More than  $1\frac{1}{2}$  million people live there. Most of them live in the western third of the country near the large lakes of Managua and Nicaragua.

Through its history, Nicaragua has had many revolutions. During a number of revolutions in the early years of this century, marines from the United States were sent to Nicaragua to help restore order. At the present time, the government has an elected president and two lawmaking bodies similar to the Congress of the United States.

There are three natural regions in Nicaragua. The Nicaraguan Depression extends southward from the Gulf of Fonseca, includes Lake Managua and Lake Nicaragua, and stretches eastward along the San Juan River to the Caribbean Sea. This lowland area and the natural waterways make up the region in which the United States has purchased the right to build a canal. East of the Nicaraguan Depression

is a highland area, and east of the highlands is a broad lowland region which includes the Mosquito Coast. More than half of the land is forested, and lumbering is a principal occupation. Cotton and coffee are Nicaragua's most important agricultural exports. The cotton is raised on farms in the lowlands near the lakes, the coffee, on highland slopes. Other crops include sesame, sugar cane, rice, corn, beans, tobacco, and bananas. In recent years the government has been encouraging farmers to raise more cattle and hogs for meat. Some frozen meat is now exported.

Many volcanoes are located in western Nicaragua, including some which are islands in Lake Managua and Lake Nicaragua. Earthquakes are frequent and Managua, the capital and largest city, is much more modern than it might be otherwise because of earthquakes. Managua was rebuilt following a severe earthquake in 1931 in which the city was almost completely destroyed.



As yet, there has been little development of mineral resources in Nicaragua, although some gold has been mined for many years. Important deposits of iron ore, gypsum, and copper have been located in recent years. As transportation facilities improve, these mineral deposits probably will be developed. Foreign capital will be needed, however, to aid in such development.

A railroad extends inland from Corinto, the main port city on the Pacific Coast, to Granada on Lake Nicaragua. Other important ports on the Pacific Coast are San Juan del Sur, west of Lake Nicaragua, and Puerto Somoza near Managua. The main port on the Caribbean Coast is Bluefields. Other important cities in Nicaragua are León, the second largest city, and Matagalpa. Find all these cities on the map on page 143.

## QUESTION BOX

27

1. Why was the Panama Canal difficult to construct?
2. What has caused some tension between the United States and Panama in recent years?
3. Why do most citizens in Panama have a higher standard of living than the people of other Central American countries?
4. What important research is being done in Costa Rica that may help to raise the standard of living in Central America?
5. Why is Managua a modern city?
6. What are the three natural regions of Nicaragua? Why may one of these be important in the future?

## HONDURAS

Honduras is the second largest of the Central American republics. It is slightly larger than the state of Tennessee. The country is shaped a little like a triangle with its base on the Caribbean Sea and its apex or point on the Pacific Coast at the Gulf of Fonseca. Almost two million people live in Honduras, and most of them are mestizos. Three-fourths of the people live in rural areas, and most of them are illiterate.

Honduras has two main regions: the north coast which is a banana-growing area and the interior highlands. Almost all of the country is mountainous. Narrow coastal plains and river valleys are the only lowlands in the country.

Most of the income which Honduras receives from exports comes from crops. Bananas are the most valuable commercial crop, with coffee, tobacco, corn, and beans also providing some income. Coffee production has been raised in recent years,

and coffee is now becoming a more important cash crop. The coffee is raised mainly in areas near San Pedro Sula and south of Tegucigalpa. Most of the money crops, except bananas, are grown on small farms. The farmers also raise beans, corn, rice, and wheat for their own use. Many of them also raise cattle and hogs.

Most of the land is covered with forests which can be used commercially when transportation facilities are improved. Most of the trees are pines with some hardwoods, including cedar and mahogany. The lumbering industry has expanded rapidly in recent years, and lumber now is the third most valuable export. A plywood factory has been built at Puerto Castilla, a port in northeastern Honduras. Unfortunately, much valuable timber in Honduras is burned each year when fires set to clear land for crops get out of control.

With the help of the United States, the



government of Honduras is attempting to improve agricultural practices and transportation facilities. Many roads have been built in recent years, including a highway from Puerto Cortés on the Caribbean Coast to San Lorenzo on the Pacific Coast. This highway passes through San Pedro Sula, the most important commercial center in the northern part of Honduras, and through Tegucigalpa. Tegucigalpa, located in the southern highlands, is the commercial center for most of southern Honduras, as well as the capital city.

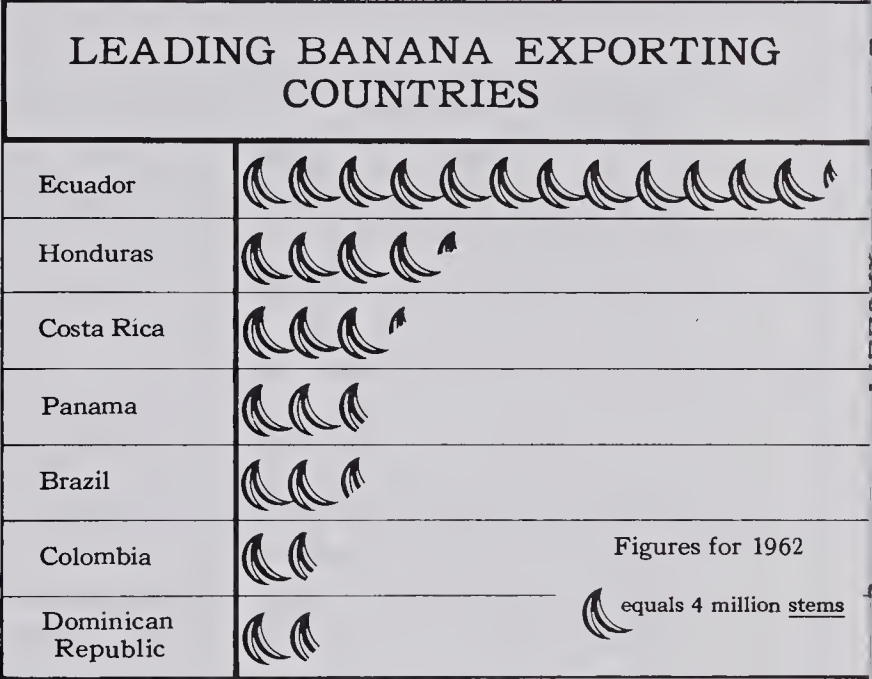
Major ports on the Caribbean Sea include Puerto Cortés, Tela, and La Ceiba. All of these are banana ports, and Puerto Cortés is also a major coffee port. The only Pacific port of importance is Amapala, which is located on Tigre Island about 20 miles from San Lorenzo. Small ships called lighters take products from Amapala to San Lorenzo, where they are transported inland by truck. Roatán, on the island of the same name in the Bay Islands, is the main port for shipping coconuts.

The amount of electricity produced in Honduras each year is about equal to the amount used by a small city in the United States. Most of the electricity is produced by diesel engines using oil which has to be imported. Recently a hydroelectric power plant was completed. It has about doubled available power produced in the country.

Normally, the Republic of Honduras has a president and vice-president, both of whom are elected for six years and cannot be re-elected for successive terms. There is one lawmaking body called the Congress of Deputies, members of which are also elected for six years. In 1963, however, military officers seized the government and dissolved the legislature. A new cabinet was selected to run the country. How long it will be until elections are held, no one knows.



View of a large banana plantation. The banana plants, which are from 10 to 20 feet tall, are set out in rows for easier handling.



The chart above shows the number of banana stems produced by Latin American countries. The office worker pictured below is checking accounts for a large fruit company.





## EL SALVADOR

El Salvador is the smallest and the most densely populated of the Central American republics. It is the only Central American country without a coastline on the Caribbean Sea. About nine out of ten Salvadorans are mestizos. More than half of them, especially those who live in rural areas, are illiterate.

The small country has three natural regions: (1) a narrow, coastal zone along the Pacific; (2) a central valley and plateau area, separated from the coast by a low mountain range; (3) a mountainous region in the northern part of the country. Most of the people live in the central valley. The country's two principal cities, San Salvador, the capital, and Santa Ana, the coffee center, are both located there. The main ports are La Unión on the Gulf of Fonseca and Acajutla on the Pacific Coast close to the border with Guatemala.

Agriculture is the main way of making a living in El Salvador, and coffee is the main commercial crop. About 85 per cent of the money received from agricultural exports comes from sale of this crop alone. Most of the coffee is exported to the United States. It is grown on some large plantations and also on small farms which are

owned by the farmers. Cotton, the second most valuable crop, sesame, and henequen are also exported. The main food crops grown by the farmers are corn and beans. The people grind the corn into meal and mix it with water to make a dough. The dough is then made into thin pancakes called **tortillas**, and fried or baked over a fire. Sugar cane, rice, sorghums, and various tropical fruits are also grown.

The population is growing very rapidly in El Salvador. In order to produce enough food for the people, higher crop yields are essential, even though most of the good land is already being cultivated. Agricultural research leading to better seeds, fertilizers, soil conservation, and mechanization is being undertaken by the government. A fishing industry is also being established in order to provide protein for the diet of the people. Shrimp, which are caught in large quantities off the Pacific Coast, are now a valuable export.

At one time, El Salvador had extensive forests, but most of them have been used or destroyed. Some erosion occurred on the slopes of mountainsides after the forests were cut or burned. The government is now trying to reforest a number of areas.

An ox-drawn cart creaks along a quiet street of San Salvador during the hot part of the day.



Tortilla-making is a daily home task in corn-growing regions of Latin America.





Mineral resources in El Salvador are very limited. As in other Central American republics, manufacturing, until recently, consisted almost entirely of processing. New plants include ones which make instant coffee, electrical appliances, corrugated cardboard, paints, concrete poles, and wheat flour. Older plants still process food, bottle beverages, and make clothing, shoes, furniture, cement, and soap. Today, hydroelectric plants provide power for both residential and commercial use.

Political and economic power in El Salvador had been held, until 1960, by only a few families who owned most of the land. Then, military leaders seized the government. Elections were held in 1962, and the people elected one of the military leaders who promised reforms. The minimum wage for a day's work on coffee plantations has been increased from ten cents to sixty cents. Income taxes must now be paid, and schools are being built in rural areas.



After coffee beans are washed in the trough, they will be spread evenly on the cement casements to dry in the sun.

The president is elected for a six-year term and may not succeed himself. Members of the Legislative Assembly are elected for two-year terms. Although progress is being made, El Salvador faces real problems because of its rapidly growing population.

## GUATEMALA

Guatemala has a population of more than four million people, which is larger than any other Central American country. More than half of the people are Indians and most of the rest are mestizos. Many of the people, especially those who live in rural areas, are illiterate.

Guatemala has three natural regions: (1) the highlands, where most of the people live; (2) coastal plains on both the Pacific and Caribbean Coasts; (3) El Petén, the northern third of the country. There are several large lakes and numerous volcanoes, now mostly inactive, in Guatemala. More than half of the land is forested, mostly with hardwoods found commonly in tropical rain forests.

About one-third of the land of Guatemala is used for farming or stock grazing.

There are many large cattle ranches on the Pacific slopes. Bananas and cotton are raised on large plantations on the Pacific plain. Abacá is raised near the Caribbean

Thursdays and Sundays are the days Indians come to trade in this village.







Modern architecture is popular throughout Central and South America. This is the new City Hall in Guatemala City, Guatemala.



*Above.* A surveyor's assistant at work in a swampy section of El Petén. *Below.* Archeologists are restoring a Mayan temple found deep in the rain forests of El Petén.



Coast. Most of the farms in Guatemala, however, are small in size and are located in the highlands area. The main export crop of coffee is raised there. About three-fourths of all the income received by Guatemala for its exports comes from coffee. Cotton is second in importance as an exported cash crop. Main food crops are corn, beans, rice, wheat, and potatoes. Some tobacco is raised.

Guatemala City, which was destroyed by an earthquake in 1916, is the capital and by far the largest city in Guatemala. It is about eleven times larger than the second largest city, Quezaltenango. The Pan American Highway and railroads connecting the two coasts pass through Guatemala City. Puerto Barrios, on the Caribbean Coast, and San José, south of Guatemala City on the Pacific Coast, are the main port cities.

In many ways, the most interesting part of Guatemala is the almost uninhabited, hot, humid, swampy El Petén. At one time, Tikal in the northern part of El Petén undoubtedly was the center for Mayan civilization. About five hundred years before Columbus discovered the West Indies, Tikal and the region surrounding it was probably the most densely populated area in North America. For some unknown reason, the people left northern Guatemala and the tropical rain forests have grown over the land. Archaeologists from the University of Pennsylvania have been uncovering and restoring buildings and temples at Tikal, and the Guatemalan government has made a national park of the area.

El Petén may, in time, become a busy, bustling area once more because petroleum has been discovered north of Chinajá. If the field proves to be a major one, many more people will move there. Since no roads or railroads have been built in El Petén, all of the equipment for drilling oil



wells had to be flown to the area. So much rain falls during the rainy season in this part of Guatemala that even the airstrips are flooded much of the time. Nevertheless, if a large petroleum field is found, roads, pipelines, and hard-surfaced airstrips undoubtedly will be constructed in this almost empty region.

At present, most of the people who live in El Petén gather chicle from the rain forests, do some lumbering, or graze cattle.

Most people in Guatemala are very poor,

and a few are quite rich. In recent years, the poor people have been demanding more help from the government. Several revolutions took place before 1963 when a military government took control. It disbanded Congress and prohibited all political parties. Then, the military leaders started trying to improve living standards. To achieve progress, more power, more industries, and more jobs will be needed. Capital from other countries may be needed, but an income tax has been started.

## BRITISH HONDURAS

British Honduras is the only colony on the North American continent. Until 1964 it was ruled by a governor appointed by the Queen of England. Then, the colony was given responsibility for its own government. The people elect a prime minister and members of the two houses of the Legislative Assembly. Elections must be held at least every five years. Most of the people of British Honduras are Negroes whose ancestors were brought to the area as slaves, but there are a number of mestizos in the colony, too.

During the early settlement of Central America, Spain and Great Britain had many quarrels and some battles over the land of British Honduras. The British, who had come to the land from Jamaica in the West Indies to get lumber, defended the territory successfully. After the Central American republics gained their independence from Spain, Guatemala and Great Britain signed a treaty setting the boundary lines of British Honduras. Nevertheless, Guatemala has claimed the land of British Honduras several times in recent years.

Many islands and coral reefs are found near the coast of British Honduras. The low coastal areas are hot and humid

throughout the year. Inland, in the southern part of the country, is a mountainous region in which temperatures are much lower. Most of the people, however, live near the coast or inland along rivers which are the main transportation routes. There are few roads and no railroads in the colony.

Dense forests cover much of the land and provide the main exports. Mahogany logs and lumber are the most valuable exports, but cedar, pine, and chicle are also shipped to other countries. Only a little of the land is farmed, the main crops being

Mahogany logs to be shipped to the United States are floated alongside this freighter.







View of a new training school for boys under construction in Belize. The lumber used is made from trees in forests nearby.

bananas, citrus fruits, sugar cane, corn, rice, coconuts, and cacao.

The capital and largest city is Belize. About one-third of the population of British Honduras lives in Belize, but the city's population is only about 30,000. Belize has only a few small factories. It serves as a major port for the export of forest products.

## QUESTION BOX

28

1. Which Central American country has no Caribbean Coast? Which has no Pacific Coast?
2. In what way does El Salvador's problem of raising living standards differ from that of other Central American countries?
3. Which country in Central America has the most land? Which has the most people? Which has the most people per square mile?
4. What product probably will be exported from Honduras in greater amounts as roads are improved?
5. What important mineral resource has been discovered in northern Guatemala? For what is this same region well known?
6. What are the most important exports of British Honduras?
7. What needs to be done throughout Central America to raise living standards?

## GLOBE AND MAP ACTIVITIES

1. Project the climate maps on pages 40 and 41 of the book. Use the projection to make two larger maps of Central America showing rainfall and prevailing winds during the rainy and dry seasons. Be sure to make a legend showing how to read the maps you prepare. You may wish to use different colors or shadings to show the amounts of rainfall.

2. Using the maps on pages 40 and 41, answer the following questions: (a) Which coast of Central America has the most rainfall annually? (b) In which season is there a greater difference between the amount of rainfall on the two coastal areas? (c) In which month, January or July, does El Petén have the higher atmospheric pressure? (d) In which month, January or July, does Panama have the higher atmospheric pressure? (e) From what direc-

tion do winds blow across Central America in January?

3. Using a globe or the map on page 143, identify the cities located at the following places: (a)  $14^{\circ} 12' \text{ N. } 87^{\circ} 23' \text{ W.}$ ; (b)  $8^{\circ} 58' \text{ N. } 79^{\circ} 32' \text{ W.}$ ; (c)  $15^{\circ} 43' \text{ N. } 88^{\circ} 37' \text{ W.}$ ; (d)  $13^{\circ} 44' \text{ N. } 89^{\circ} 10' \text{ W.}$ ; (e)  $9^{\circ} 58' \text{ N. } 84^{\circ} 4' \text{ W.}$ ; (f)  $9^{\circ} 22' \text{ N. } 79^{\circ} 54' \text{ W.}$

4. (a) Which of the cities located in Question 3 is farthest east? (b) Which city is farthest south? (c) Which city is farthest west? (d) Which city is farthest north?

5. Using a globe and the scale of statute miles on it, compute the distances a steamship would travel from La Guaira, Venezuela, to Guayaquil, Ecuador: (a) through the Panama Canal; (b) around the southern tip of South America.



6. Which of the following cities is farther from the equator: (a) Guatemala City, Guatemala, or San Pedro Sula, Honduras? (b) San Salvador, El Salvador, or Tegucigalpa, Honduras? (c) Colón, Panama, or Recife, Brazil? (d) Managua, Nicaragua, or Lima, Peru? (e) Belize, British Honduras, or La Paz, Bolivia? (f) Santa Ana, El Salvador, or Brasília, Brazil? (g) Limón, Costa Rica, or Bogotá, Colombia?

7. Which of the following cities has the greater amount of rainfall between May 1 and

October 31: (a) Brasília, Brazil, or Managua, Nicaragua? (b) Panama City, Panama, or Maracaibo, Venezuela? (c) San Salvador, El Salvador, or Belém, Brazil?

8. Which of the cities in Question 7 has the greater amount of rainfall between November 1 and April 30?

9. When it is 8:00 A.M. in Brasília, Brazil, what time is it at each of the following places: (a) Panama City, Panama? (b) Lima, Peru? (c) La Paz, Bolivia? (d) Managua, Nicaragua? (e) Where you live?

## OTHER LEARNING ACTIVITIES

1. Make a large chart listing the Central American republics and the one colony in order of size of land area. Then, in separate columns add information such as the following: population, capital city, main products, special items of interest. Compare these findings with similar information for selected countries of Latin America and for the United States.

2. What types of climate found in South America (see page 31) are also found in Central America? List them, and indicate with each type of climate, one or more places where it is found. Be prepared to justify your answers orally.

3. Visit or write to a travel agency to request information about both airline and ship tours to Central American countries. Plan a trip based on the information you receive. Be sure to compare costs and time required for the two means of transportation.

4. Prepare a written report, which will be duplicated and bound into a collection with reports from other class members, on one of the following people or subjects, or a subject of your own choosing: Juan R. Moro, Francisco Morazán, José M. Delgado, Justo R. Barrios, José S. Cañas, Miguel Larreinaga, José C. del Valle, Rubén Darío, George W. Goethals, Tomás Herrera, Vasco N. de Balboa, Pedro de Alvarado; Juan Vásquez de Coronado, José Cecilio del Val; Artists of Central America; Musicians of Central America; Writers of Central America.

5. Join a group to do the following project: On a large outline map of Central America (enlarged through use of the opaque projector) draw the Pan American Highway, the Panama Canal, and railroads. Also, locate major ports and capital cities. Then, illustrate major activities of the people by appropriately placed drawings. Use pictures in the text, other textbooks and encyclopedias, and films and filmstrips to give you ideas about the peoples' ways of living. Be sure to include scenes from modern cities as well as rural areas in your drawings. When it is completed, you may wish to exhibit the activities map in the lunchroom or hall so that others in the school may learn from your work.

6. Join small groups to prepare skits in which events of particular importance to Central America are dramatized. As you present your skit to the class, be sure not to use correct names or refer to dates which would quickly give away the event. See how many members of your class are able to identify correctly the event presented. Choosing a recent event, rather than one which happened many years ago and which is known to everybody (such as Balboa's discovery of the Pacific Ocean), will make the problem harder for your classmates. Be sure, however, to dramatize an *important* event—not something of little significance. If you are not sure about the importance of the event that you or your group has chosen, it might be wise to check with your teacher first.









## THE WEST INDIES

Northeast of Central America are a number of islands which lie between the Caribbean Sea and the Atlantic Ocean. These islands, known as the West Indies, include three main island groups: the Greater Antilles, the Lesser Antilles, and the Bahama Islands. Study the map on page 143 which shows these three groups of islands.

The Greater Antilles include Cuba, Jamaica, Hispaniola, and Puerto Rico. The Lesser Antilles include, in the north and east, the Virgin Islands, the Leeward Islands, and the Windward Islands. (See map, page 165.) They also include Trinidad and Tobago, which are located near the coast of Venezuela, and a number of smaller islands to the west. The Lesser Antilles extend in a horseshoe-shaped line from the Virgin Islands to the island of Aruba, north of Venezuela. Most of the islands in the Lesser Antilles are owned by the United States, France, Great Britain, or the Netherlands. Trinidad-Tobago together form an independent country in the Commonwealth of Nations. The Bahama Islands extend southeastward from near Florida toward Hispaniola.

As the maps show, Cuba is the largest

island of the West Indies. Notice that there are two countries — the Republic of Haiti and the Dominican Republic — on Hispaniola, the second largest island. Notice, also, the many small islands which have not yet been mentioned.

**Climate.** As the maps on page 40 show, northeast trade winds blow across the West Indies all during the year. These winds and the warm sunshine provide an almost perfect climate for the people who live in the West Indies. Day after day during both winter and summer months the climate is almost ideal. Considerable rain falls on the windward or northeastern sides of the islands. The southern sides of the islands generally receive much less rainfall. Can you explain why?

The almost perfect weather of the West Indies is occasionally broken, particularly during the late summer and early fall months, by tropical storms called **hurricanes**. Hurricanes are tropical cyclones, which are vast storms moving with a circular motion and covering an area which may be as large as 400 miles in diameter. They form only over water and usually blow themselves out soon after reaching





The path of the "eye" of a hurricane is closely watched on a radar screen.

land. Hurricanes usually form in the Caribbean Sea or farther east in the Atlantic Ocean, and then move northwestward toward the Gulf of Mexico. Sometimes, these storms move across Cuba and northward along the eastern coast of the United States. Hurricanes often cause great damage. To be of hurricane force, winds must blow at least 75 miles per hour; sometimes, winds reach speeds of 125 or even 150 miles an hour. At the center of a hurricane is calm air which is known as the "eye" of the hurricane. Hurricanes are destructive not only because of the strong winds but also because they cause high tides and heavy rains. As a result, floods frequently cause more damage than the winds.

The United States Weather Bureau, working with the United States Navy and the Air Force, now has a hurricane warning system. All tropical storms which might develop into hurricanes are located and the paths of the storms are plotted. Planes fly through the winds and radio information to the Weather Bureau which, in turn, warns residents of both the West Indies and the United States. With sufficient warning, people can leave low-lying areas which may be flooded and can take measures to help prevent damage to their property. Ships at sea also are warned and change their courses to avoid the hurricanes. Small boats in harbors have to be



These men in Barbados are cutting blocks of coral, a useful building material.

much more securely moored, too, when such storms approach.

Hurricanes occur in the West Indies between the months of June and November. They never strike the West Indies during the winter months of the Northern Hemisphere, because they can form only when the sun is almost directly overhead. It is at these times that the air near the Earth's surface is the warmest, and there is a greater temperature difference between masses of cold and warm air. Movements of these air masses develop into hurricanes. During winter months the weather in the West Indies is considered ideal by many people. Thousands of visitors travel to these islands then to bask in the sun while their friends at home are shoveling snow.

**The Land.** Most of the islands in the Greater Antilles and the Lesser Antilles are mountainous, and in most cases are the tops of submerged mountain ranges. Some of the mountains are extinct volcanoes. Only Cuba, among all the larger islands, has rolling land areas of considerable size.

By contrast, most of the Bahama Islands are low and sandy. They have been slowly built by small animals in the sea called coral polyps. The coral polyps are too small to be seen by the human eye, but can be seen under a microscope. They take minerals from the salt water and build hard limestone deposits around their



bodies. These deposits are known as coral. Thousands of years are required to build a coral reef, which is a bank of coral just below the surface of the water. Such submerged reefs can be very dangerous for ships at sea. Unless the water is seen breaking over a submerged reef, a ship may strike it and sink. Of course, most reefs are now known and are shown on the maps which sailors use.

**Major Crops.** In no respect is the similarity of the West Indies to Central American countries greater than in the crops which are grown. By far the most important crop of the West Indies is sugar cane. Many other crops also are grown, including tobacco, corn, beans, rice, tropical fruits, coffee, and cacao. Among the tropical fruits grown are pineapples, bananas, citrus fruits, mangoes, pomegranates, and dates. Coconuts are also gathered from palm trees which grow in abundance on the islands of the West Indies. Some cotton and arrowroot are grown. Cattle are grazed on many of the islands.

**Brief History.** Columbus probably was the first white man to land on any of the islands of the West Indies. He is believed to have reached San Salvador, one of the eastern islands of the Bahamas, in 1492. At that time he found peaceful Indians living on the islands. In time, settlers from

Europe came to establish sugar and tobacco plantations, and forced the Indians to work on these plantations as slaves. When many of the Indians died, the Europeans brought Negroes as slaves from Africa. Today there are more Negroes than whites on many of the islands. Of course, slavery was stopped a long time ago, but many of the Negroes still work as sharecroppers on large farms.

As the Appendix shows, many of the islands of the West Indies are heavily populated, and the population is continuing to grow rapidly. Cuba is the only large island in the West Indies which has much space for more people. Barbados, an eastern island of the Lesser Antilles, is one of the most crowded lands on earth. About 1,400 people per square mile live on this small island. Jamaica and Puerto Rico are also very crowded. Present rates of increase will result in a doubling of the population of the West Indies in about 30 years. Very rapid progress toward industrialization will have to be made if these islands are to support this many people. Since mineral fuels are not available on most of the islands, it is difficult to see how major industries can be developed profitably. Other countries undoubtedly will have to provide assistance to these small nations in the years ahead.

Note how the group of small islands called the Lesser Antilles stretch in a curve from Puerto Rico to and along the coast of Venezuela.





## CUBA

Until 1895, when a revolution against Spain erupted, Cuba was a Spanish colony. During this revolution, the United States battleship *Maine* was blown up while anchored in the Havana harbor. Shortly thereafter, the United States declared war on Spain. The Spanish forces in Cuba were soon defeated, and Cuba was given her independence. The United States agreed, until 1934, to protect Cuba against control by any other nation. Since that date, however, Cuba has been an independent nation. The United States still maintains a naval base at Guantánamo Bay at the southeastern end of Cuba. The base is useful in protecting the approaches to the Panama Canal.

**Government.** Until 1959, Cuba was controlled by a dictator who had become very rich and powerful while many of the people lived in poverty. Two sons of a rich sugar planter, Fidel and Raul Castro, decided to free the Cuban people from this dictatorial government. They organized a small band of young men to overthrow the government, but their first attempt failed. Going then to Mexico, they organized another group of young Cubans who were anxious to free the people from the dictatorship. They landed in Cuba in 1956, lived in the Sierra Maestra mountains, and began making raids on government forces. The government tried hard to locate and destroy Castro's forces; but many people, who were anxious for a revolution, helped support the Castro band. Gradually, the revolution spread, and in 1959, the dictatorship was overthrown. Fidel Castro became the premier of Cuba.

At first, it appeared that Castro would bring democratic government to Cuba. He had promised free elections, better housing, better schools, and farmland for the sharecroppers. Instead, Castro and his

advisors began to provide a Communist type of government. Oil refineries, sugar mills, telephone and electric-power facilities, hotels, and many other businesses owned by Americans were seized by the Cuban government. Then, all other businesses were taken over by the government. Thousands of Cuban businessmen, doctors, and lawyers fled to other countries, including the United States.

The Cuban army was made much larger, and modern equipment for it was sent from the Soviet Union. In 1962, Soviet missile bases being built in Cuba were photographed by airplanes belonging to the United States. For a few days it appeared that World War III might erupt. The United States blockaded the island with warships and demanded that the missiles be removed. The Soviet Union was told that any missile directed from Cuba against any nation in the Western Hemisphere would be considered as an attack by the U.S.S.R. on the United States. Within about a week, the Soviet Union agreed to take the missiles back to the U.S.S.R.

Since Castro came to power in Cuba, the economy of the nation has suffered greatly. The sugar crop has never once been as large as the average yield before Castro. Food supplies have been smaller, too. All food is now rationed; for instance, a person can buy only three-quarters of a pound of meat once a month. The tourist trade which had been a great source of income has, of course,







Well-laid plans and many hands and machines are needed to grow sugar cane on a large scale. The low-flying airplane is spraying sugar cane fields with a ripening agent. Sometimes, the day before the cane is cut, excess leaves and brush are burned purposely. (Burning will not harm the sugar cane crop because the cane stalks are heavily-laden with sugar-bearing juice.) Although machines exist for cutting cane, it is usually cut by hand with machetes. On the same day that the burned, brownish cane is cut, it is shipped by truck or train to a sugar mill for processing.



At this mill, the cane is processed into yellowish-brown raw sugar, about 98 per cent pure. It is then placed in bags and carried by a conveyor system to waiting ships. Most sugar is shipped abroad as raw sugar, and later refined for table use.



stopped. Most trucks and automobiles made in the United States stopped running because spare parts were not obtainable. All petroleum is imported from the Soviet Union. It probably is costing the U.S.S.R. about one million dollars a day to keep the Communist government going in Cuba.

In 1964, the OAS imposed economic sanctions on Cuba because Venezuela was able to prove that Castro had sent guns to Communists in Venezuela. The weapons were to be used to overthrow the Venezuelan government. All nations in the Western Hemisphere except Mexico and Canada promised not to trade with Cuba.

**The Land.** Cuba is about 745 miles long and has an average width of 60 miles. There are three mountainous areas, as the map on page 143 shows, and swampy areas along the low southern coast. The highest mountains, the Sierra Maestra in the south-east, reach an altitude of almost 6,000 feet. In central Cuba is a lower range, the Trinidad Mountains, and in the west an even lower range, the Sierra de Los Órganos.

Coral reefs surround the island of Cuba and there are about 1,600 small islands near the shore. The Isle of Pines, south of the western part of Cuba, is the largest of these small islands. Most of the islands are comparatively undeveloped.

Most of the land in Cuba is rolling plains which have fertile soil. At one time, much of the island was covered with forests, but these have been practically destroyed in order to obtain more land for farming.

**Major Crops.** About half the cultivated land of Cuba is planted in sugar cane. Cuba is the largest producer and exporter of sugar in the world. Until recently, most of the sugar was sold to the United States. Since 1960, when the Cuban government seized many companies and much property belonging to American citizens, Cuban sugar has not been purchased by the U.S.A. Much sugar has been sent from Cuba to the Soviet Union in the past few years, however. The sugar has partly paid for many products, including guns and planes, furnished Cuba by the U.S.S.R.

Other major crops grown in Cuba are tobacco, pineapples, and winter vegetables. At one time, so much of the land was planted in sugar cane that considerable quantities of food had to be imported. Castro ordered more land to be planted in food crops. Food shortages have continued, nevertheless. Cattle, which are grazed on grassy mountain slopes, provide a little fresh meat for the Cuban people. Dairy herds are raised near Havana, the capital and largest city.

The Castro government in Cuba is controlled by Communists. *Left to right.* A sulfur plant which was seized by the government; soldiers guarding a telephone building; people leaving Cuba to escape Communist rule.





**Minerals.** A number of important mineral deposits, including copper, nickel, manganese, chrome, and iron, have been found in Cuba. Comparatively little use has been made of some of these mineral deposits. Before leaving, some American companies had owned the mineral-rich lands. Some copper, manganese, and nickel had been mined and a number of oil companies were trying to find petroleum in Cuba. Only a few producing wells had been drilled successfully when United States' companies were forced by the government to leave the land.

**Cuba's Future.** What the future of Cuba will be is hard to predict. Before Castro, the people wanted and needed better government. The need still exists, but the Cuban people are not likely to get a higher standard of living for many years, if ever, under a Communist government. Moreover, freedoms such as those enjoyed by citizens of the United States will not be achieved until the Communists in Cuba are overthrown. Elections have not been held and probably won't be until Castro is sure of winning. Only one name for each office will probably be on the ballots even then.

## JAMAICA

South of Cuba is the island of Jamaica. It is an island about 146 miles long and about 56 miles wide at the widest point. More than 1½ million people live on the island. Several small islands nearby are also part of Jamaica. Kingston is the largest city and the capital.

Until 1961, Jamaica was part of the West Indies Federation. This Federation had been started in 1956 to unite thirteen islands in the West Indies which had been British possessions. In 1961, Jamaica voted to withdraw from the Federation. It became an independent country in 1962.

Most of the people in Jamaica are farmers. Sugar cane and bananas are principal export crops, going mainly to Great Britain. Agricultural exports bring Jamaica about two-thirds of its income. By far the most important export, as far as Canada and the United States are concerned, however, is bauxite. Jamaica has the largest known deposits of this valuable mineral. One Canadian company and three American companies mine bauxite in Jamaica and ship it to their plants on the continent. The Canadian company, however, processes the bauxite to alumina in Jamaica be-

fore shipping it. At the present rate of mining, Jamaica has enough bauxite for the next 100 years! The bauxite is mined by strip methods. After the ore has been removed, top soil is returned to its rightful place, and grass is planted for cattle.

Manufacturing industries are growing rapidly in Jamaica. Sugar mills and distilleries which make rum have been there for many years. New plants include a cigarette factory, oil refinery, and a small steel mill. Jamaica earns millions of dollars every year caring for tourists.

These Jamaicans are on their way to market. Why can such a wide variety of fruits and vegetables be grown in Jamaica?





# HISPANIOLA

The island of Hispaniola contains two countries — the Dominican Republic in the east and the Republic of Haiti in the west. About two-thirds of the land area is in the Dominican Republic.

**Brief History.** Columbus discovered Hispaniola on his first voyage to the West Indies. The first Spanish settlement in the New World was started at Santo Domingo in 1496 by the brother of Christopher Columbus. The name of the city was changed to Ciudad Trujillo in 1936 when a dictator named Trujillo seized power. It was changed back when Trujillo was killed in 1961. Santo Domingo has the oldest church, university, and hospital in the Western Hemisphere.

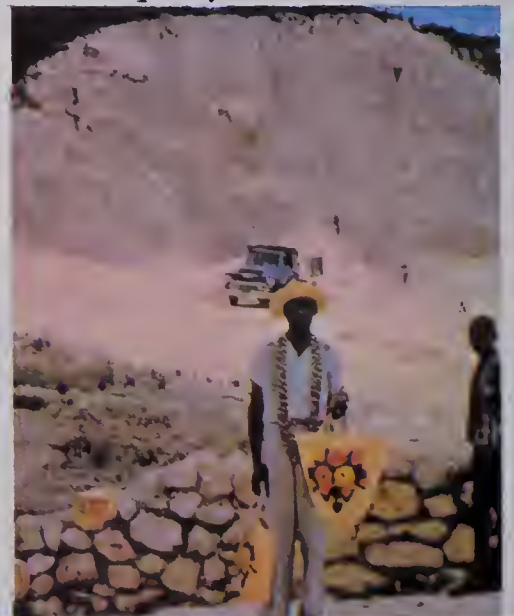
In the 17th century, French settlers occupied the western part of Hispaniola, bringing many slaves from Africa to work on the plantations. The Negroes were treated so cruelly that as early as 1679 they began to revolt against the French owners. It was more than 100 years later, however, before slavery was abolished in Haiti. Early in the 19th century, the Negroes overthrew the French and established the Republic of Haiti. For many years, Haiti suffered because of attempts by various persons to achieve political power. By 1820, the country was united and the Haitians set out to conquer the eastern two-thirds of the

island. The Dominican Republic declared its independence from Spain in 1821, but it was soon conquered by the Haitians. Between 1822 and 1844, the Haitians controlled all of Hispaniola. Then the people of the Dominican Republic revolted and achieved their independence. Relationships between the two countries have been somewhat tense ever since. A dictator now rules in Haiti.

In Haiti, the language spoken is French. More than 95 per cent of the people are Negroes, and most of the rest of them are mulattoes. Spanish is the official language of the Dominican Republic. About one-fourth of the people are of European descent, about one-eighth of the people are Negroes, and most of the rest are of mixed ancestry. Since 1961, a number of governments have tried to bring peace and prosperity to the Dominican Republic. Each one has failed. Most have been overthrown by revolutions. It is hard to predict what will happen next.

**The Land.** Four mountain ranges, with broad valleys between them, cross the island in a general east-west direction. The highest range is near the center of the island, and has a peak 10,200 feet in altitude. Because of the mountain ranges, the climate varies considerably from place to place. In general, rainfall is greater in the

*Left.* This picture shows the mountains that rise behind Port-au-Prince, Haiti. Much of Hispaniola is mountainous. *Right.* This native vendor in Haiti is selling hand-woven straw bags. Behind him is a quarry.





northeast, decreasing toward the southwest, and the mountain slopes have more rainfall than do the lowlands. Irrigation is necessary in many parts of Hispaniola, particularly in the western and southern portions of the island.

**Transportation.** There are few railroads on the island of Hispaniola. In Haiti, short rail lines extend from Port-au-Prince, the capital, in three directions. The longest spur, which is about 90 miles in length,

extends northwestward to the port of St. Marc. In the Dominican Republic, the only rail line extends inland to Moca from the port of Sánchez. It serves the richest agricultural region of the country. Both countries have international airports near their capital cities and several smaller airports at other points. Many vessels sailing between the United States and Central or South American ports stop at Port-au-Prince or Santo Domingo.

## PUERTO RICO

East of Hispaniola is the small island of Puerto Rico. Find it on the map on page 143. Puerto Rico is a self-governing Commonwealth, but is joined by choice with the United States. Citizens of Puerto Rico are United States citizens and may move to the United States if they wish. If they do, they are regarded as voting citizens of the country. While living in Puerto Rico, however, they cannot vote for a president of the United States. Instead, they elect their own governor and legislators.

Puerto Rico is a very mountainous island, and less than half of the land can be farmed. Until about ten years ago, most Puerto Ricans earned their living in agriculture. As the population grew, farmers tried to cultivate the steep mountainsides. They cut and burned the natural cover,

causing floods and erosion. Today, although the population of Puerto Rico is continuing to increase rapidly, only about one-fourth of the people make their living from farming. Each year, more people go to work in factories, most of which are branches of firms in the United States.

Finding more jobs for Puerto Rican citizens has not been easy. The little island has no mineral fuels to provide power, but it does have considerable rainfall. Dams have been built to hold water in lakes so that electricity can be made inexpensively. Hundreds of new factories have been started, and thousands of homes and apartments have been built for the workers. In the past few years, for the first time in history, the products of Puerto Rican industry have been more valuable than the coun-

*Left.* Pineapples are harvested at a plantation in the northwestern part of Puerto Rico. *Right.* This picture shows one of the many new industries which have been started so that people in Puerto Rico will have jobs.





try's agricultural products. At the same time, however, agricultural production has increased. Sugar cane has long been the most important agricultural export. Much tobacco is also raised. Coffee, pineapples, other tropical fruits, rice, and many kinds of vegetables are grown by the farmers. To improve the diet of the people, many more livestock and poultry are raised now than were raised a few years ago.

Puerto Rico has never been able to get much income from the sale of minerals. In 1962, however, a major deposit of copper ore was located. Plans are underway to build a concentration plant and a smelter. Industries using copper will be developed.

One of the greatest improvements made recently in Puerto Rico is in education. During the past ten years, about one-third of the people have been in school. Not only are boys and girls learning to read and write, but young people are learning the skills needed for work in modern factories. Older people who never had the opportunity to attend school are also being educated. Although Spanish is the language of most Puerto Ricans, all schools are now teaching boys and girls to speak English, also. Puerto Rican citizens who speak English will have less difficulty finding jobs in the United States if they should decide to move to the mainland.

**Will Puerto Rico Be the 51st State?** People are now wondering whether Puerto Rico will become the 51st state of the United States. Until Hawaii was accepted as the 50th state, most people thought there was little possibility that Puerto Rico would become a state. Now, however, some citizens in Puerto Rico and some Puerto Ricans who live on the mainland are working hard to achieve statehood. Other citizens, however, think that the island is in a better position as a Commonwealth joined with the United States. There would be advantages attached to statehood, and yet there

are some good reasons for maintaining the present arrangement. The people already enjoy freedom and independence, and the United States guarantees to defend the island from any possible invasion. The United States government spends millions of dollars each year in Puerto Rico, helping to improve education, housing, roads, agriculture, and industry. Yet, citizens of Puerto Rico do not have to pay the income tax which citizens on the mainland pay.

**The Puerto Rico Trough.** Just north of the island of Puerto Rico is one of the deepest parts of the Atlantic Ocean. The map on page 174 shows that cartographers make maps of ocean areas as well as of land areas. Different shades of blue are used on the map to show the depth of the water at any place. Areas with shallow water are shown as almost white and the very deep water is shown as dark blue. Depths in fathoms are also given on the map. One fathom equals six feet. You will see that just east of Puerto Rico the water is only about nine or ten fathoms deep. North of Puerto Rico, the ocean floor dips steeply to the Puerto Rico Trough. Near the western end of this deep trough or valley in the ocean floor is a spot called the Milwaukee Depth. Find it on the map. As you can see, this point on the ocean floor is 5,030 fathoms (or 30,180 feet) deep. Do you remember the altitude of the highest mountain on the Earth? If this mountain were placed in the Milwaukee Depth, would it reach the surface of the ocean?

Oceans not only have great troughs, but also ridges which are submerged mountain ranges. Notice, for instance, how shallow the water is between the Nicaragua-Honduras coast and Jamaica. You may wish to do some additional study of the geography of oceans by using maps found in atlases or those published by the National Geographic Society.





*Left.* A public market on the island of St. Thomas. These people have come to sell the fruits and vegetables which they have raised. *Right.* A panoramic view of Charlotte Amalie, the capital of the Virgin Islands.

## THE VIRGIN ISLANDS

East of Puerto Rico are the Lesser Antilles, small islands which are the peaks of submerged mountain ranges. Those farthest to the northwest are called the Virgin Islands. About 50 of these islands were purchased by the U.S.A. from Denmark in 1917 for \$25,000,000. It was thought then that they could be used to protect sea lanes leading to the Panama Canal.

The three largest islands owned by the United States are St. Thomas, St. John, and St. Croix. Find them on the map on page 165. St. Thomas is the only one of these three islands with a good harbor, which is located at Charlotte Amalie, the capital.

Most of the people on St. Thomas live in the capital city. The rest live on estates scattered throughout the island. The main problem on St. Thomas is maintaining an adequate water supply. Rain water is collected from the roofs of the houses and even from the runway of the airport. The water is stored in large concrete storage basins and purified before being used.

The soil on St. Thomas is fertile, and most of the food needed by the people can be raised on the island. Quite a bit of the

land is used for the grazing of cattle.

St. John, the smallest of the three islands, is located only about four miles east of St. Thomas. A large part of this island has been set aside as a national park.

The largest and most thickly populated of the three main islands is St. Croix. The northern part of St. Croix is somewhat mountainous, but the southern part is rolling, fertile land. Sugar cane is raised on large plantations. Two small cities, Christiansted and Frederiksted, are on St. Croix. Neither of these cities has a good harbor. Lighters must be used to transport goods to ocean vessels which must anchor offshore.

Most of the people living in the Virgin Islands are Negroes or mulattoes. They are citizens of the United States and may move to the mainland if they wish. As in the United States and Puerto Rico, all children are required to attend school. The United States maintains an air base on St. Thomas and radio stations on the other two islands. The government also maintains an agricultural experiment station on St. Croix, where scientists experiment with ways of improving crop yields.





The map above shows ocean depths in the Caribbean Sea and other portions of the Atlantic Ocean.

## TRINIDAD — TOBAGO

The nation of Trinidad-Tobago became an independent country in the Commonwealth of Nations in 1962. Most of the land (all but 116 square miles) and most of the people are on Trinidad. Almost 900,000 people live on these two islands, an average of more than 467 per square mile. The largest city is Port of Spain, the capital. Find it on the map on page 143.

The people who live on Trinidad have come from many parts of the world. When slavery was abolished on the island, many

Indians and Chinese were brought to work on the plantations. Today, all of these plus Europeans and native Indians live together peacefully and happily.

The government is like Canada's. A governor represents the Queen, but the real head of the government is a premier. He is the leader of the political party having a majority in the House of Representatives. There are two houses in the legislature. Members of the upper house are appointed; those in the lower house are elected.

On a wharf in Port of Spain, Trinidad, a horse-drawn cart is loaded with goods.

Marine Square in Port of Spain is the heart of this port city's shopping center.





**Agriculture and Industries.** About one-third of the land is used for crops or for grazing livestock. Most of the rest of the land is forested. The most important crop is sugar cane, but cacao, citrus fruit, coffee, bananas, and coconuts are raised, too. Many types of tropical fruits are grown for local use as are many vegetables. Some rice, wheat, corn, and dairy products have to be imported.

Petroleum is by far the most important natural resource. Refining petroleum is the most important industry. About half of the nation's income comes from petroleum. Much natural gas is available in the oil fields, too, but it is not as yet being used extensively. In time, because of this available power source, other industries may grow rapidly.

Sugar processing is the second most important industry. A number of small plants make items such as textiles, glass, furniture, soap, matches, and other products needed by the people. There are also fertilizer and cement plants.

As in Jamaica and Puerto Rico, the tourist



Tobago is known for its many beautiful beaches.

industry is growing rapidly. Tobago is especially noted for its fine beaches. Trinidad is perhaps best known for its asphalt lake. Chunks of natural asphalt are dug from the surface of this "lake" and are refined. The level of the lake does not drop as the asphalt is taken from its surface. At one time much of the asphalt was used to pave roads, and some is still used that way. Since the petroleum industry has developed, most asphalt for paving now comes from the refining process. The lake is still an interesting tourist attraction.

## OTHER ISLANDS IN THE LESSER ANTILLES

Two of the largest islands in the Lesser Antilles, Guadeloupe and Martinique, are owned by France. Both of these islands are known as overseas departments of The Community. Locate them to the north and south of Dominica on the map on page 165. More than 200,000 people live on each of the islands. As you can see on the map, Guadeloupe includes two islands, Basse Terre and Grande Terre, separated by a narrow channel. Chief exports from both Guadeloupe and Martinique are sugar, rum, bananas, cacao, coffee, vanilla, and pineapples.

West of Grenada, the Lesser Antilles lie parallel to the northern coast of Venezuela. A number of the islands are owned by

Venezuela, but three of the larger ones in the western section of the chain are possessions of the Netherlands. Aruba, Curaçao, and Bonaire in the Lesser Antilles, plus three small islands in the Leeward Islands group, constitute the Netherlands Antilles. Willemstad, on Curaçao, is the capital for the Netherlands Antilles. Aruba and Curaçao are known primarily because of the large oil refineries which have been constructed there. Much of the oil from the Maracaibo oil fields in Venezuela is refined on Aruba and Curacao before being shipped to world markets. Chief agricultural products in the Netherlands Antilles include corn, beans, citrus fruits, sweet potatoes, coconuts, and bananas.



## THE BAHAMA ISLANDS

North of Cuba and Hispaniola, and southeast of Florida, lie the Bahama Islands which are owned by Great Britain. There are about 700 islands and about 2,000 additional small low-lying islands called cays in the Bahamas. Many of the islands, such as Grand Bahama Island, are coral islands and usually are long and slender. Nassau, on New Providence Island, is the capital of the Bahama Islands and is a favorite resort for North Americans weary of winter weather. Fish abound in the shallow waters surrounding the islands. Many tourists fish, or go skin diving, among the coral reefs.

At present, the principal occupation in the Bahama Islands is taking care of tourists. Most of the islands are forested, and some lumber is exported to Canada. Salt and okra also are exported. Many cattle are grazed on the islands, and dairy herds supply milk and meat to the Nassau stores. At one time, many sponges were collected in the shallow waters. The government now regulates sponge fishing because the supply of natural sponges was being used up too rapidly.

Grand Bahama Island may, in time, become an important industrial center. A free port has been created there, and 50,000 acres of land have been set aside

for industrial development. Factories which locate there will be exempt from taxes for 30 years. Raw materials needed for the factories may be imported tax-free for a period of 99 years. The Gulf Stream flows just west of Grand Bahama Island. Many ships sailing along the eastern coast of the United States pass within a few miles of the island.

### QUESTION BOX

29

1. What three main island groups are in the West Indies? What islands and groups of islands do they include?
2. What are hurricanes? When do they occur? Why do they occur?
3. What is a coral reef? How is it formed?
4. What is the major crop of the West Indies? What island produces the greatest amount of this crop?
5. What kind of government does Cuba have? What do you think of this type of government? What do you think might happen in Cuba in the future?
6. What is an important export of Jamaica?
7. How do the Puerto Ricans make a living? What has been done to raise the standard of living there?
8. Do you think that Puerto Rico will become the 51st state of the United States? Why?
9. Why were the Virgin Islands bought from Denmark in 1917?
10. What is the most important natural resource of Trinidad? Why do many tourists visit Tobago?
11. What is the principal industry in the Bahamas at present? What may develop in the future?

View of a portion of the waterfront at Nassau, in the Bahamas.





## GLOBE AND MAP ACTIVITIES

Use the globe, any of the maps in the book, or a large wall map to answer the following questions:

1. About how many miles is it from the western tip of Cuba to the southeastern tip of Trinidad?
2. How deep is the deepest part of the Caribbean Sea both in fathoms and in feet? What is the location of this spot in degrees and minutes of latitude and longitude?
3. How deep is the water just east of Puerto Rico?
4. Which part of Hispaniola has the greatest annual rainfall? Which part of the year is the rainiest?
5. What city in the West Indies has the largest population?

6. Which country on Hispaniola is the most thickly populated?

7. Are there more people per square mile in Puerto Rico or in Jamaica?

8. What is the location of each of the following cities to the nearest degree and minute: (a) Havana, Cuba? (b) Nassau, New Providence Island? (c) Santo Domingo, Dominican Republic? (d) Willemstad, Curaçao? (e) San Juan, Puerto Rico? (f) Port-au-Prince, Haiti?

9. If you flew from Barranquilla, Colombia to Philadelphia, what main island in the West Indies would you fly over?

10. What parallel of latitude crosses Cuba and almost touches Hispaniola? What parallel crosses three large West Indies' islands?

## OTHER LEARNING ACTIVITIES

1. Prepare a large chart listing the major islands of the West Indies according to size in land area, population, and population per square mile.

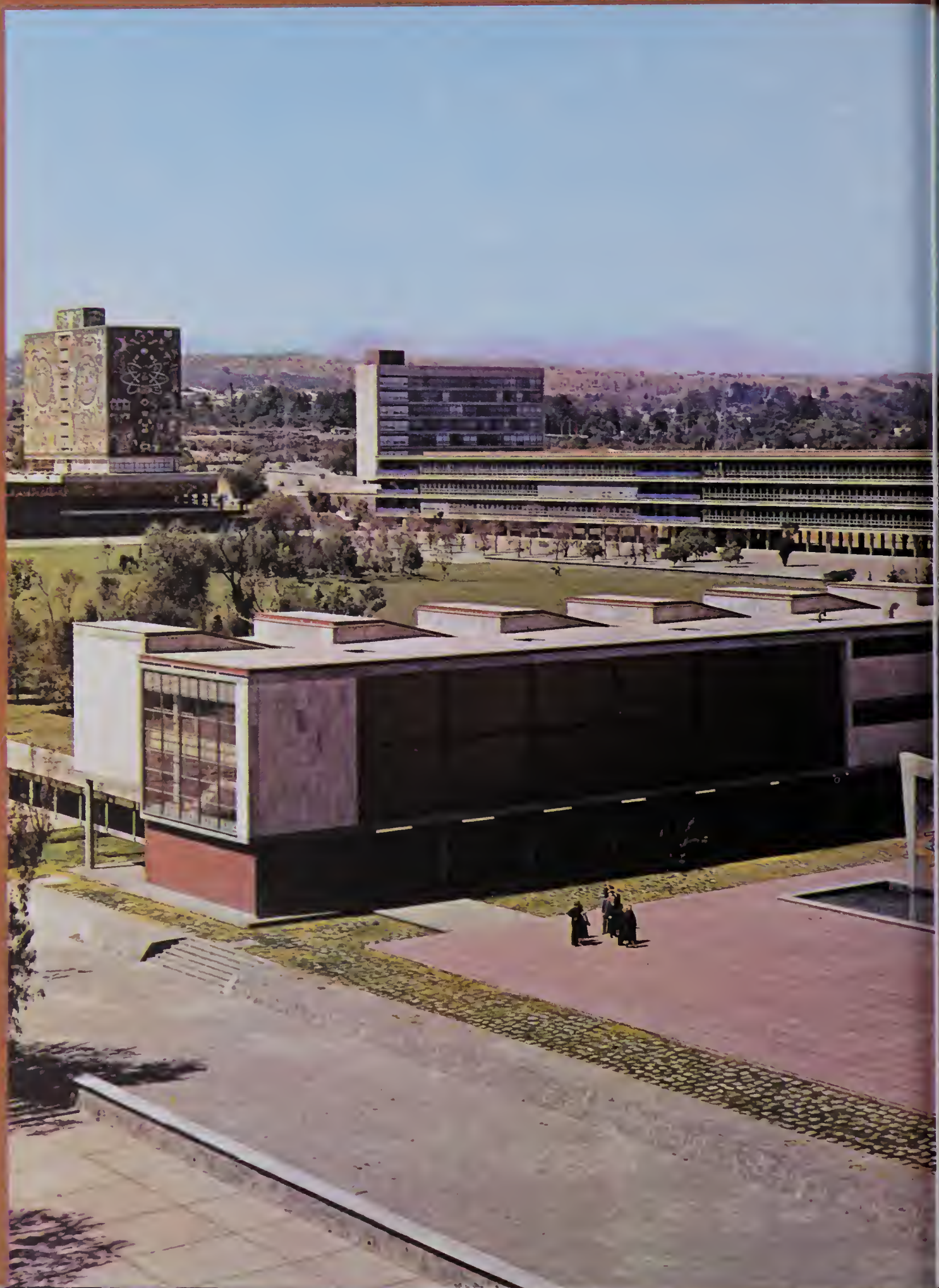
2. Project onto a large chart or piece of paper an outline map showing the western Atlantic and Caribbean Sea, including the West Indies. Then draw in probable sea lanes for ships traveling between the following ports: (a) New York City, New York—New Orleans, Louisiana; (b) New York City, New York—Colón, Panama; (c) London, England—Colón, Panama; (d) Barranquilla, Colombia—Baltimore, Maryland; (e) Caracas, Venezuela—Boston, Massachusetts; (f) Maracaibo, Venezuela—Newark, New Jersey. Develop some generalizations about the location of the West Indies to add to the bottom of the chart.

3. Join a group to look through back issues of *The National Geographic* magazine and other magazines which may have pictures taken on islands of the West Indies. Prepare an illustrated travelogue which highlights these islands, and present it to the class using the opaque projector. You may wish to record your comments prior to the presentation so that you may listen to the presentation, too.

4. Join a group to prepare written reports, which will be duplicated and distributed to class members, on the following subjects: (a) The Story of Sugar Cane; (b) Cuba under Batista and Castro; (c) Puerto Rico—People, Progress, Probable Future; (d) The Story of Aluminum—from Jamaican Bauxite to Finished Products; (e) The Tourist Business in the West Indies; (f) Oceanography of the Caribbean Sea; (g) Early History of the West Indies; (h) New Nations in the West Indies—Problems and Prospects; (i) Sponges—Natural and Man-made. Also prepare highlights about one of the subjects which will be presented orally to the class. You may wish to use audio and/or visual aids in your presentation.

5. Prepare a chart showing highest temperatures, lowest temperatures, and average temperatures for January, July, and annually in each of the following places: (a) San José, Costa Rica; (b) Buenos Aires, Argentina; (c) Colón, Panama; (d) La Paz, Bolivia; (e) Lima, Peru; (f) Maracaibo, Venezuela; (g) Miami, Florida; (h) New York City, New York; (i) Punta Arenas, Chile; (j) Bogotá, Colombia; (k) Rio de Janeiro, Brazil; (l) San Juan, Puerto Rico. (The Appendix will be useful.)









# MEXICO

North of Central America and south of the United States is the country of Mexico, officially named the United Mexican States. The country has 29 states, two territories, and one federal district in which Mexico City, the capital and largest city, is located. The two territories are Baja California Sur, the southern part of the long peninsula extending southward from California, and Quintana Roo, along the eastern coast of the Yucatán Peninsula. Quintana Roo is likely to become a state before long.

Mexico is the third largest Latin American republic in land area; only Brazil and Argentina are larger. At the present time, Mexico has a population of about 37 million people, more than any other Spanish-speaking country in the world. The population is increasing annually at a rate of about  $3\frac{1}{2}$  per cent, one of the highest rates of increase in the world. Although two-thirds of the people still live in rural areas, the cities are growing rapidly. Mexico City is now the fourth largest city in North America.

**Early History.** Long before European explorers found their way to the North American continent, important civilizations

had been developed in Mexico by three Indian tribes. The first of these civilizations was developed by the Mayas, most of whom lived on the Yucatán Peninsula. For many years, archaeologists have been uncovering and restoring ruins of the temples and buildings constructed by the Mayas in the northern part of the Yucatán Peninsula. The three main centers of ancient civilization were Chichén Itzá, Uxmal, and Dzibilchaltun. All are fairly close to Mérida, the state capital of Yucatán, and are important tourist attractions.

The most recently discovered ruin, Dzibilchaltun, is the only area which probably was inhabited continually from about 2,000 B.C. until after the arrival of the Spanish. Much of the work of uncovering and restoring the ruins has been done by American scientists. The cost of their work has been borne by the Mexican government, the Carnegie Institute, and the National Geographic Society. The scientists have found many pyramids, temples, pillars, and even a ball court. A game that was similar to our game of basketball evidently was played by the Mayas many years ago.



The Mayas, in addition to being builders, were excellent farmers, with corn or maize their main crop. In order to know when to plant the corn, they studied the stars and developed a calendar. When the Mayas were first discovered by Europeans, their calendar was much more exact than the one being used in Europe. Instead of having 12 months of different lengths, the Mayas divided the year into 18 months of 20 days each and added another period of five days. They also knew that an additional day was needed every fourth year. The Mayas were the only people in the New World who had developed a system of writing. They used pictures, as did the ancient Egyptians, rather than an alphabet.

No one knows exactly why the Mayas finally left Yucatán and moved southward into Guatemala and Honduras. Perhaps a long drought, too much rain, or plant diseases which destroyed their crops caused them to move. Their conquest by the Toltecs may also have been a reason. The Toltecs moved southward from the drier regions of northern Mexico and settled near the present location of Mexico City. Eventually, they conquered the Mayas and learned much from them. At one time, the Toltecs controlled most of the area between the Tropic of Cancer and the land which is now Guatemala.

The Aztecs, the third Indian tribe to build a civilization in Mexico, were fierce fighters who easily conquered the Toltecs. The Aztecs built their capital on the present site of Mexico City. When the first Spanish explorers reached Mexico, the Aztecs were the ruling tribe.

**The Spanish Conquest of Mexico.** In 1517, Yucatán was discovered by a Spanish explorer from Cuba named Córdova, who returned with good reports of the land. In 1519, a Spanish expedition from Cuba, led by Cortes, landed on the east coast near the present site of Veracruz. From there, Cortes and his men worked their way inland, and in two years' time conquered the Aztecs and took possession of their capital city. After the defeat of the Aztecs, Cortes became the ruler of Mexico. Gold and silver articles which he sent to Spain encouraged many other Spaniards to come to Mexico in search of treasure. The Spanish took the land from the Indians, divided it into haciendas, and made the Indians work on the haciendas practically as slaves.

Catholic priests came with the Spaniards to convert the Indians to Christianity. They built missions, and taught the Indians the Spanish methods of farming and other occupations. Most of the people in Mexico today belong to the Roman Catholic Church.

The mural below, which was painted by an Indian, shows how the artist believes the Indians were treated by the Spanish invaders. Many of the Indians were forced to work in mines.





For about 300 years, Mexico remained under Spanish rule. In 1821, under the leadership of General Augustín de Iturbide, the Mexican people won their freedom, and the nation became independent. September 16 is Independence Day in Mexico, for it was on September 16, 1810, that the first declaration of independence was made. Between 1821 and 1910, however, little progress was made in Mexico. Dictators in power did little to educate the people or improve their standard of living. In 1910, the dictatorship was overthrown and for several years thereafter, Mexico was rocked by a series of revolutions. Gradually, however, a democratic government was formed. Many of the great land holdings were divided so that, for the first time since the Spanish conquest, many farmers owned the land they cultivated.

**Mexico Today.** In recent years, Mexico has been making great strides forward. Thousands of factories have been built and rivers have been dammed in order to produce electric power and irrigate arid lands. Fine highways and railroads have been constructed, and modern ways of farming have been introduced. Perhaps the most important effort of the government in recent years has been to educate the people. As late as 1920, half of the people could not read or write, but by 1950, only about one-fifth of the people were illiterate. In the past 10 years, many schools have been opened in rural areas, and more teachers have been educated. Before long, almost all children and their parents will know how to read and write.

**The Land.** Mexico is almost one and one-half times the size of Alaska. As the map on page 183 shows, the country is much wider in the north than it is in the south. The northern boundary with the United States is 1,549 miles long. The distance across the Isthmus of Tehuantepec is only about 130 miles.



Archaeologists believe that this is how the Aztec capital looked at one time. The Temple of the War God is on the left. The Aztecs called this city *Tenochtitlán*.

The Sierra Madres extend across Mexico from south to north in a shape much like that of a chicken wishbone. As the map shows, the single range divides into two ranges south of Mexico City. The Sierra Madre Occidental has much higher peaks than does the Sierra Madre Oriental. Between these ranges is a high plateau which slopes downward toward the north. Near Mexico City, the plateau is about 8,000 feet in altitude; near the Rio Grande, it is about 4,000 feet above sea level. The plateau is fairly rugged with low ranges and valleys. More than half of the people of Mexico live on the southern part of this plateau.

There are four main regions in Mexico: (1) the volcanic heartland which extends across the south central part of the country; (2) the arid northern region; (3) the coastal lowlands; and (4) southeastern Mexico.

**The Volcanic Heartland.** Among the high mountains extending across the country just south of Mexico City are many volcanoes. Snow-capped Mount Citlaltepetl, which is shown on some maps as Mount Orizaba, is 18,700 feet high and is the highest peak in Mexico. Popocatepetl and Iztaccihuatl, both more than 17,000





*Top to bottom:* Iztaccihuatl, the "Sleeping Lady"; dry farming in northern Mexico; Acapulco, a coastal city; a village in the southeast.



feet, are a few miles southeast of Mexico City. Most of these volcanoes are extinct.

North of the volcanic peaks and between the two ranges of the Sierra Madres is the heartland of Mexico. This region is densely populated, and is the center for most of the agriculture, industry, and commerce of Mexico. Products from all over the country are brought to this area to meet the needs of the people. Many products made in the factories of the heartland are sent to other areas of Mexico.

**The Northern Region.** The map on page 183 shows that there are large areas of desert in northern Mexico. As in the southwestern part of the United States, fine crops can be grown where the land is irrigated. Much of the land which cannot be irrigated is used for grazing cattle and sheep. Northern Mexico also contains the country's largest deposits of mineral ores.

**The Coastal Lowlands.** Mexico has an extremely long coastline, partly because of the two large peninsulas. Coastal lowlands in Mexico vary in width from narrow strips to areas 200 miles wide. The lowlands along the Gulf of Mexico and on most of the Yucatán Peninsula are hot and humid throughout the year. Farther north along both coasts, and on the northern coast of the Yucatán Peninsula, there is much less rainfall. The coastal lowlands are important to Mexico because they contain deposits of petroleum, natural gas, and sulfur.

**The Southeast.** Southeastern Mexico includes much of the low Yucatán Peninsula and a mountainous area to the west of Guatemala. Few people live in this region. Tropical products, including coffee, henequen, cacao, vanilla, bananas, and pineapples, are raised here. Products obtained from the tropical rain forests which cover much of the area include chicle, mahogany, and Spanish cedar. Natural gas is now pumped 500 miles to Mexico City from a huge field near Villa Hermosa.





**MEXICO**

Scale 250 miles to one inch

0 125 250

MOUNTAINS	FARMLAND
DESERT	EVERGREEN FORESTS
TROPICAL RAIN FORESTS	SEMIARID GRASSLAND AND FOREST

Lambert Azimuthal  
Equal-area Projection





Northern Mexico has extensive cattle-raising regions and, where irrigation is possible, important cotton-growing areas. *Above.* Livestock graze in a semi-desert region. *Right.* A cotton field in northern Mexico.



### QUESTION BOX

30

1. What city is the fourth largest city in North America?
2. Why can it be said that the ancient Mayan civilization was very advanced for its time?
3. What Indian tribe ruled Mexico at the time of the first exploration of Mexico by the Spanish?
4. What did Cortes find that encouraged many other explorers to come to Mexico?
5. Why is September 16, 1810, an important date in the history of Mexico?
6. What are the four main regions of Mexico? Which region is the most densely populated? Which region contains the largest mineral deposits? Which region contains petroleum resources?

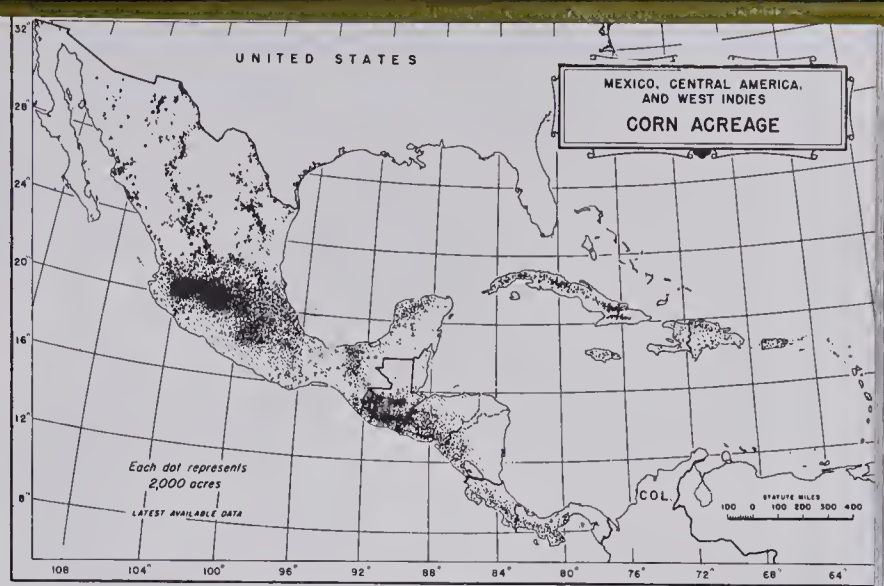
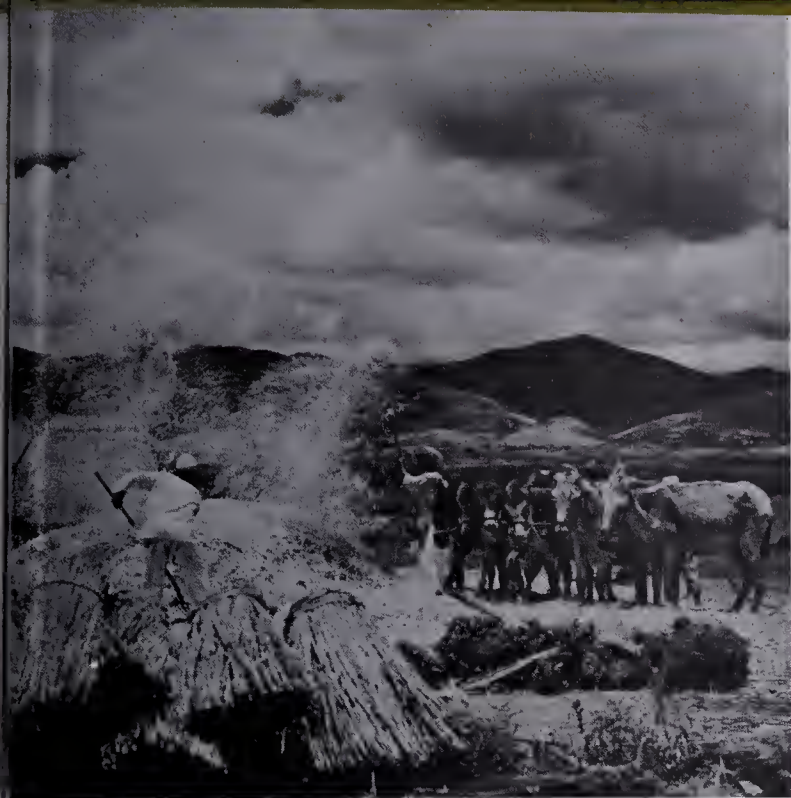
**The Climate.** The Tropic of Cancer extends across the middle of Mexico. As a result, there is little seasonal difference in temperature anywhere in Mexico. The major differences in temperature from place to place depend primarily on altitude. Three general types of climate are

found in the country. The Tierra Caliente, or hot lands, are at low altitudes, especially along the Gulf Coast. The Tierra Templado, or temperate lands, are found at higher altitudes such as the central plateau. These areas have a very pleasant climate throughout the year. The Tierra Fria, or cold lands, are located in the very high mountains. In these areas every night is cold, and snow covers most of the highest peaks throughout the year.

The only seasons which exist in most of Mexico are related to rainfall. The rainy season lasts from June to September, and the dry season from October through May. As the rainfall maps on page 41 show, the amount of rainfall decreases from the southeast toward the northwest. Some areas along the Gulf Coast receive as much as 200 inches of rain annually. On Baja California, however, there are areas which have no rain for several years at a time.

**Agriculture.** Progress in Mexico has been rapid in many areas, but no more dramatic progress has been made in any area than in agriculture. Because so much of Mexico is mountainous or desert land, food once had to be imported as the population grew. By developing irrigation systems and adopting modern farming methods, Mexico





These men are threshing wheat by tossing it into the air with pitchforks. The map above shows where corn is grown in Central America. Note that most of the corn grown in Mexico is raised in the south-central part.

now produces enough food for its people. In addition, Mexico also obtains about half of its income from agricultural products. Cotton is by far the most important money crop, with coffee second to it in value. These two crops alone account for almost half of the value of Mexico's exports. However, other crops including henequen, sugar, peanuts, tomatoes, and cacao also bring some income to the country.

About half the farmland in Mexico is planted in corn, most of which is consumed in Mexico. The corn is used in making tortillas. Other food crops include rice, wheat, beans, barley, peppers, potatoes, citrus fruits, bananas, and chick peas.

Tobacco, coconuts, and alfalfa also are grown in considerable quantities.

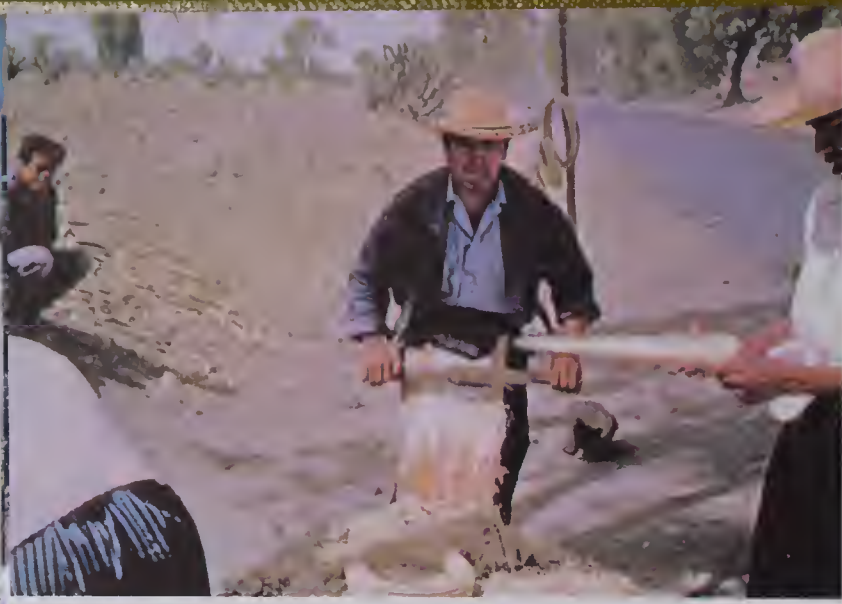
In the northern region, farmers grow cotton, tomatoes, corn, beans, rice, grapes, sugar cane, sesame, and chick peas. Many of the farmers here use the most modern methods of farming, including machinery, fertilizers, and hybrid seeds. A hybrid plant is the offspring of two parent plants which have opposite or different characteristics. By cross-breeding plants, scientists often can obtain a variety of plant which combines the best characteristics of both parent plants.

Most of the henequen, from which a strong fiber is obtained, is grown in the

Small engines pull trailers loaded with sugar cane from the fields to the mill. Most sugar cane produced in Mexico is raised in irrigated fields.







*Above.* Damaged ends of long henequen fibers must be combed before they are twisted and woven into rope. *Right.* Burros are dwarfed by huge loads; these animals are especially useful in mountainous country.



*Above.* Boats such as these in a harbor on the Gulf of California go into deep water to catch shrimp. *Below.* Indians still use butterfly nets to catch fish that live in some of the small lakes in Mexico.



northern part of the Yucatán Peninsula. The fiber is principally used in twine and rope. Northern Yucatán has porous soil which allows the heavy rain to sink rapidly through it. The surface therefore dries quickly, and these conditions are excellent for growing henequen. Mexico provides the world market with about half the total amount of this fiber each year.

**Stock Raising.** Grazing animals has been an important industry in Mexico since the early days of Spanish rule. It is particularly important in the northwest where crops cannot be grown without irrigation. On its ranches, Mexico now has about half as many cattle as there are people in the country. The government, through its agricultural experiment stations, is trying to improve the breeds of beef and dairy cattle. There are about half as many hogs and sheep in Mexico as there are cattle. The hogs usually are raised in corn-growing areas, while the sheep are grazed on high mountain slopes.

Many horses still are used in Mexico, particularly in mountainous areas. Burros are favorite pack animals in the mountains because they are sure-footed and can live on very little food and water. Enough chickens to meet the needs of the people are also raised in Mexico.

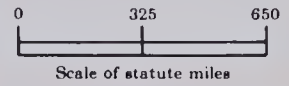
**Fishing and Forestry.** Fishing is an important industry along the Gulf Coast, in the Gulf of California, and along the western coast of Baja California. Shrimp is the



# NORTH AND SOUTH AMERICA

## RELIEF MAP

ELEVATIONS ABOVE SEA LEVEL



San Francisco

Vancouver

Ottawa

Washington

New York

Mexico

Feet

12,000

6,000

3,000

1,500

600

Sea level

Sea level

3,000

6,000

12,000

18,000

Rio de Janeiro

Valparaiso

Buenos Aires





The man has climbed a tree to draw chicle sap. He is cutting the bark. The sap flows down the gashes and is collected at the base of the tree. A tree can be tapped only every five years and many trees die when they are tapped. Most of the sap is exported to the United States and is used in making chewing gum.



*Above.* Ore cars are loaded with silver-bearing ore from chutes which are arranged so that many cars can be loaded at one time. *Below.* A night view of one of Mexico's largest oil production centers.



most valuable catch, but sardines, sea bass, Spanish mackerel, and red snapper also are caught in considerable numbers. About half of the catch is frozen and exported, mostly to the United States.

Forests cover about one-fifth of the land of Mexico. Mahogany and chicle are the two most important products obtained from the tropical rain forests in the Southeast. Some Spanish cedar, ebony, and rosewood also are cut. Pine, spruce, and fir trees grow on the lower mountain slopes. Through the years, unfortunately, many of these trees have been used for fuel or were burned to clear the land. The government now has placed most forested areas under national control to protect and improve forest resources.

**Mineral Wealth.** Ever since Mexico's mineral wealth attracted the Spanish settlers, it has been an important source of income to the country. Although the silver mines have been worked for hundreds of years, Mexico still leads the world in production of silver. However, other minerals produce more income today, the most important being petroleum. Only nine countries in the world produce more petroleum than Mexico. Most of the petroleum is obtained near the east coast between Tampico and Veracruz. Copper, lead, zinc,



The machinery shown in this picture spins cotton fiber into yarn. The men are wearing masks so that they will not breathe the lint which fills the air in the room.



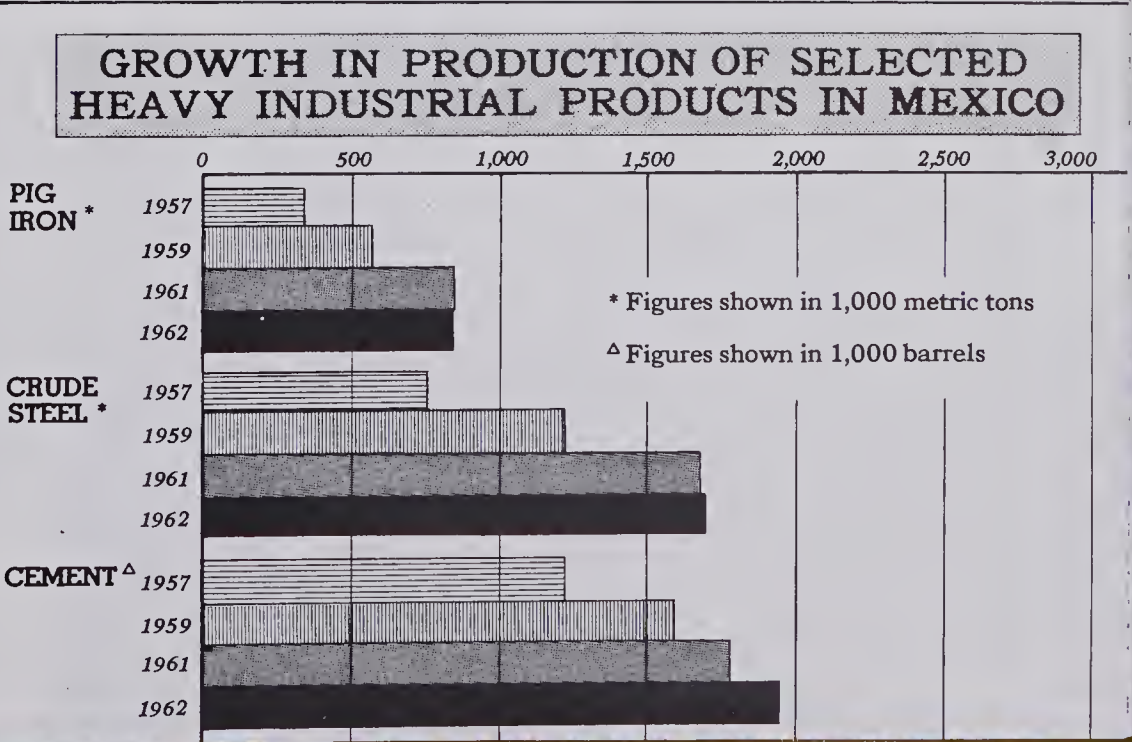
and sulfur also are important exports. In addition to these minerals, Mexico has a considerable supply of coal, iron, and manganese which enables the country to produce steel in important quantities. The iron and steel center, which sometimes is called the “Pittsburgh of Mexico,” is Monterrey in northeastern Mexico.

**Manufacturing.** Manufacturing industries in Mexico are growing very rapidly, and manufactured products have become the second most valuable source of income. The industries which are growing most rapidly are iron and steel, paper, cement, leather goods, chemical products, and fertilizers. One of the largest industries in Mexico is that of making textiles. Monterrey, Puebla, León, and Guadalajara all

are textile centers. In addition to iron and steel, factories in Monterrey also make beverages, paper, glass, matches, and furniture. Guadalajara, the second largest city in Mexico, is a center for the production of soap, shoes, glass, and metal products. San Luis Potosí is the center for flour milling and the synthetic fiber industry. Veracruz and Tampico are the centers for producing and refining petroleum.

Other manufactured products include canned food, sugar, vegetable oils, cigarettes, rubber goods, machinery, and electrical appliances. Railway cars, trucks, buses, and tractors are manufactured in Mexico, and a number of different kinds of automobiles are produced there. Manufacturing capacity has been increasing at

This graph shows the growth that has taken place in manufacturing industries in Mexico during recent years.







Homes made from sun-baked bricks are fairly cool in hot, dry areas because the bricks provide good insulation from the heat.

a rate of about six per cent a year. By contrast, manufacturing capacity in the United States has been growing in recent years at an average annual rate of about three per cent.

In addition to its many manufactured products, Mexico has long been known for its high-quality handicrafts. Many people make by hand articles of silver, tin, copper, pottery, leather, wood, and natural fibers. Many of these products are bought by the hundreds of thousands of tourists who visit Mexico each year.

You can see Maguey cactus growing in the background. After processing, its strong fibers can be made into ropes and baskets.



**Tourist Industry.** The tourist industry in Mexico contributes greatly to the country's income. In a recent year, more than 600,000 tourists spent more than half a billion dollars in Mexico. Quite a bit of the money is spent in cities along the border with the United States, but much of it is spent in Mexico's world-famous tourist centers. These include Mexico City and the resort cities of Acapulco, Cuernavaca, Taxco, and Veracruz. To encourage tourists, especially from the United States and Canada, six highways have been built from Mexico's northern border to Mexico City. Millions of dollars are being spent, moreover, to modernize and beautify the border cities. The Pan American Highway also has been completed from Mexico City to the border with Guatemala. Additional roads are being built along both coasts and from coast to coast. Airports have been constructed throughout Mexico to serve tourists who wish to travel by air.

**Mexico City.** The capital city is one of the most modern in the Western Hemisphere. It has several very tall buildings, wide boulevards, and lots of traffic. Art museums, concert halls, libraries, schools, and many churches make it a cultural center and an interesting place in which to live. It is also one of the most important industrial centers in Mexico. The capital is connected with most other cities in Mexico by highway or railroad.

One of the country's proudest accomplishments is the new campus of the University of Mexico in Mexico City. In recent years, more than \$25,000,000 has been spent to build this new campus. The buildings were planned by the University's architectural school. More than 70,000 students attend the University of Mexico, which is one of the world's largest and best equipped universities. It is likely that this nation will continue to make rapid progress in the years ahead.





*Above.* Designs are being applied to trays that will be lacquered by hand. *Right.* Fruits, vegetables, and many hand-made articles are sold in this street market. *Below.* Sturdy trucks are frequently converted to serve as buses in rural Mexico.



*Right.* Colorful baskets and mats are sold in a street market in Taxco. *Lower left.* View of Acapulco, a popular tourist resort. *Lower right.* Mexico City has busy, wide boulevards and many tall, modern buildings.





## QUESTION BOX

31

1. Why is there little seasonal difference in temperature throughout most of Mexico? What factor is the cause of the major differences in temperatures?
2. What factor determines the change of seasons in Mexico? What three general types of climate does Mexico have?
3. What progress in farming methods has taken place in Mexico?
4. What crop is planted on about half of the land of Mexico? How is most of this crop consumed?
5. What are hybrid seeds? Why are they developed by scientists and used by farmers?
6. Why is cattle raising particularly important in the northwestern part of Mexico?
7. In production of what mineral does Mexico still lead the world? What other mineral is an even greater source of income?
8. Why has Mexico been able to develop an important iron and steel industry? Which industries are growing most rapidly in Mexico?
9. How has Mexico encouraged people to travel there from the United States and Canada?
10. If a new canal to connect the oceans were dug in Mexico, where do you think it would be located?

## GLOBE AND MAP ACTIVITIES

1. Because of Mexico's uneven coastline, a number of gulfs and bays surround the country. Using any of the maps in this book and wall maps in the room, list as many of these as you can identify.

2. Project a map of Mexico onto a large piece of paper. Trace the boundaries for the 29 states, two territories, and the federal district. Label each of these. Then, also locate properly the following major cities on the map: Mexico City, Guadalajara, Monterrey, Puebla, Mérida, San Luis Potosí, Mexicali, León, Torreón, Ciudad Juárez, and Veracruz.

3. About how many miles is it by direct flight from: (a) Tijuana, Mexico, which is located just south of San Diego, California, to the eastern coast of the territory of Quintana Roo? (b) Ciudad Juárez to Mexico City? (c) Mexico City to Guatemala City? (d) Mexicali to the southern tip of Baja California? (e) Tijuana to the Gulf of Mexico at the border near Matamoros, Mexico? (f) One coast to the other across the Isthmus of Tehuantepec?

4. When it is 10:00 A.M. in Mexico City,

what time is it at: (a) Monterrey? (b) Mexicali? (c) The port of Mazatlán? (d) Mérida? (e) El Paso, Texas? (See map, page 326.)

5. Which is farther east: (a) Mexico City or Denver, Colorado? (b) Mexico City or Dallas, Texas? (c) Mérida, Yucatán or New Orleans, Louisiana? (d) Mérida, Yucatán or Havana, Cuba? (e) Guadalajara, Jalisco or Albuquerque, New Mexico?

6. Which of each of the following places has the greatest annual rainfall: (a) Tampico, Veracruz or Veracruz, Veracruz? (b) Mexico City, or San Juan, Puerto Rico? (c) Nogales, Sonora or Manzanillo, Colima? (d) Ciudad Juárez, Chihuahua or Villa Hermosa, Tabasco? (e) Campeche, Campeche or La Paz, Baja California? (Use Table X and map on page 183.)

7. Locate as accurately as possible, in degrees and minutes, all the cities of Mexico mentioned in numbers 2, 3, 4, and 6.

8. Where in Mexico would you buy land if you wanted to: (a) start a sheep ranch? (b) start a banana plantation? (c) start a cattle ranch? Be prepared to defend your choices.



## OTHER LEARNING ACTIVITIES

1. Obtain an up-to-date road map of Mexico from a service station or travel bureau, and project it to make a large map showing major highways. Plan several trips you might take from your home to different parts of Mexico. Can you visit Chichén Itzá without flying to Mérida? Can you drive to Acapulco? Can you drive to La Paz, Baja California?

2. Join a group to make special reports on various aspects of Mexican life, including: (a) Religious life and holidays; (b) Food and clothing in both urban and rural areas; (c) Dances and music; (d) Sports; (e) Art and architecture; (f) Transportation and communication; (g) Education; (h) Homes and homelife; (i) Commerce and industry; (j) Government and politics; (k) Agriculture, fishing, forestry; (l) Famous tourist resorts.

3. Discover someone in your community who has lived or traveled in Mexico, preferably one who has slides to show and objects to exhibit. Plan with your teacher to have such a person visit the class. In making plans for the visit, be sure to develop a list of questions that you wish answered. If possible, give this list of questions to the person several days before he visits the class.

4. Prepare a large chart which lists all the countries of Latin America in order from largest to smallest with reference to land area, population, and population per square mile. Draw a heavy red line around Mexico in each list to highlight its position relative to the other Latin American countries.

5. Use a reference book such as the *Statistical Abstract of the United States* to obtain some comparable data about Mexico, Brazil, Argentina, and the United States. Interesting charts or graphs can be made to show information such as: (a) Food supply per person; (b) Production of various farm crops; (c) Number of people working in manufacturing industries; (d) Value of imports and exports; (e) Production of coal, petroleum, cement, iron ore, steel, etc.; (f) Amount of railway traffic and number of passenger cars; (g) Number of telephones. As you look for such

information, keep in mind other kinds of data which you might wish to chart or graph.

6. Join a group to preview the films and filmstrips which are in the school's audio-visual library. Select several of the best ones for presentation to the entire class.

7. Join a group to prepare a quiz show or an objective test on Latin America. Divide your class into two groups and see which group does better on the quiz or test.

8. Make an extensive study of the early Indian tribes in Mexico and present your findings to the class. Some audio-visual aids should be used in your presentation, perhaps some pictures from the National Geographic Society's book, *Indians of the Americas*.

9. Make a list of generalizations which apply to all Latin American countries. Then, add to the list generalizations which apply only to some, but be sure to indicate which ones. Finally, add generalizations which apply only to one country. Be prepared to defend the generalizations you have made in a class discussion, during which a combined list is prepared by the total class.

10. Make a collection of records containing Mexican tunes and arrange them for a class presentation. Be sure to include the Mexican national anthem. If there is a Latin-American Club in your school, you might want to ask the members to help in this activity.

11. Prepare a written report, which will be duplicated and bound into a collection with reports from other class members, on one of the following people, or a person of your own choosing: Hernando Cortes, Miguel Hidalgo, Antonio de Santa Anna, Benito Juárez, Diego Rivera, Montezuma, Porfirio Díaz, Pancho Villa, Manuel Ávila Camacho, Lázaro Cárdenas, Victoriano Huerta, José Clemente Orozco, Adolfo López Mateos.

12. Make a map with pictures or drawings of the main exports of Mexico. Place the pictures at the location of the ports from which the products are exported. Draw colored lines to show where the ships take the products.

13. Write a story about life on a cattle ranch in Mexico.









# THE UNITED STATES AND CANADA

As we have learned, the two main regions of the Western Hemisphere are Latin America and the large countries in northern North America, the United States and Canada. Some geographers call the latter region *Anglo-America*, because most of the people speak English. *Anglo* is an adjective meaning *English*. Both the United States and Canada have many ties with Great Britain. People from Great Britain were primarily responsible for the early settlement and development of both countries. Both nations were controlled mainly by the British until the United States obtained its freedom in the War for Independence. Much later, Canada obtained its freedom peacefully. Canada, today, is an independent member of the Commonwealth of Nations.

**Why the United States and Canada Are Important.** Learning more about the United States and Canada is important for many reasons, among which are the following:

1. This vast area varies from place to place in climate, topography, vegetation, and resources. Although you probably know quite a lot about the various parts of

the United States and Canada, there is more that you could learn and should know.

2. This area of the Western Hemisphere is one of the most productive, if not the most productive, on the face of the Earth. It contains the world's largest fertile, well-watered plain, and the world's largest group of related industrial plants. In both countries, farmers use machines and scientific methods of agriculture. In both countries, huge factories manufacture products for home use and for export.

3. Most of the densely populated areas are crisscrossed by fine highways, railroads, and air routes. This good transportation system has been partly responsible for the growth of industry. You most likely will have many opportunities to travel throughout much of the United States and Canada.

4. Relationships between the people of the United States and Canada have been friendly and cooperative for many, many years. The two countries have more than 5,000 miles of common border across which the people may move freely. Neither country believes that it is necessary to protect the border with military equipment.



5. Most large businesses which operate in one country also have branches in the other. Some of them started in Canada and then moved to the United States. Others started in the United States and then moved to Canada.

6. Much trade is carried on between the two countries. The United States imports more Canadian goods than does any other nation. Likewise, the United States exports more goods to Canada than it does to any other nation. Many of the products are moved from one country to the other across the Great Lakes, or are taken across the border on trains. Since the railroad tracks are the same gauge, goods do not have to be unloaded and reloaded at the border.

7. The two nations have jointly constructed the St. Lawrence Seaway between the Great Lakes and the Atlantic Ocean. Dams, locks, and power plants were built by both countries and are used by both. Canada bore more of the expense of construction, however, than did the United States.

8. The United States and Canada together have tremendous mineral resources and vast water resources, both of which are essential for industrial development. Raw materials, as well as manufactured goods, flow across the border. Canada, for instance, imports large quantities of coal from the United States while it exports iron ore to the United States.

9. Both countries play an important role in world affairs, often taking the leadership in the United Nations in defending freedom and justice throughout the world. Although the governments of the two countries do not always agree upon the position to take in world affairs, they usually work out a position which both can support. Usually, but not always, both governments take the position that what is good for one is good for the other.

**Land Area and Topography.** Canada is the world's second largest country in land area, containing 3,851,116 square miles of territory. Only the U.S.S.R. is larger. The United States is the fourth largest country in size of land area, with 3,615,206 square miles of territory. How large an area do the United States and Canada cover together? This combined area is larger than all the countries of Latin America together and is almost the size of the Soviet Union.

As the map on the right shows, there are four main regions in the United States and Canada. These include (1) western mountains and plateaus, (2) the North American Plain, (3) the Canadian Shield, and (4) the Appalachian Highlands and coastal plains.

**Western Mountains and Plateaus.** In the western part of both countries are the high Rocky Mountains and a lower range near the Pacific Coast, usually known as the Coast Mountains or Coast Ranges. Between the Rockies and the Coast Ranges are high plateaus. The mountains are highest in the north, where Mount McKinley stretches majestically 20,320 feet above sea level. The highest point in Canada, Mount Logan, is 19,850 feet high and is also located quite far north in the southwestern corner of the Yukon. Large rivers flow from the mountains toward the Arctic Ocean, the Pacific Ocean, the Gulf of Mexico, and Hudson Bay. Among them are the Columbia, Yukon, Mackenzie, Saskatchewan-Nelson, Fraser, Colorado, Missouri, and Rio Grande.

**The North American Plain.** East of the Rockies the world's largest plain extends from the Arctic Ocean to the Gulf of Mexico. In the north, the plain is about 300 miles wide; near the United States-Canadian border, it is about 700 miles wide. In the central part of the United States, the plain extends 1,500 miles from Denver, Colorado, to Pittsburgh, Pennsylvania.



Although many rivers flow across this huge plain, the three main river systems draining it are the Mackenzie, Saskatchewan, and Missouri-Mississippi. The Mackenzie River with its tributaries, the Slave, Athabaska, and Peace rivers, drains the northern portion of the plain. The Saskatchewan drains the greater part of the plain in southern Canada. The Missouri-Mississippi with a main tributary, the Ohio, drains most of the plain in the United States. The direction of flow of these rivers and their tributaries indicates the slope of the land on the North American Plain. Near Denver, the plain is about 5,000 feet above sea level. It is considerably lower in altitude near the Appalachians in the east and near the Canadian Shield in the north.

**The Canadian Shield.** A vast area of Canada and a small part of the United States lie within the Canadian Shield. Millions of years ago, huge glaciers repeatedly scraped over this region. As the map shows, there are thousands of lakes scattered throughout the Canadian Shield. In fact, an easy, rough way to define the borders of the Shield is to draw a line from the Gulf of St. Lawrence through the Great Lakes, and then northward through Lake Winnipeg and Great Bear Lake to the sea. Generally, the land is composed of very hard rock under thin topsoil, and is covered with forests. It is a rich storehouse of minerals, having important deposits of nickel, iron, gold, silver, copper, and uranium. A small region, the Hudson Bay Lowlands, is surrounded by the Shield.



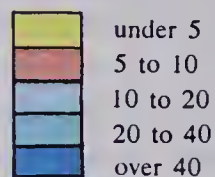


NOV. 1 TO APRIL 30



# AVERAGE RAINFALL IN UNITED STATES AND CANADA

INCHES



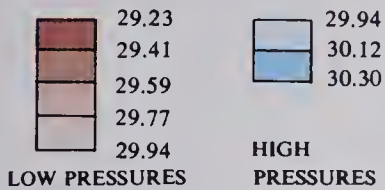
Note the large areas in North America that have less than 10 inches of rainfall during both six-month periods. Is most of this area east or west of the Rocky Mountains?

MAY 1 TO OCT. 30

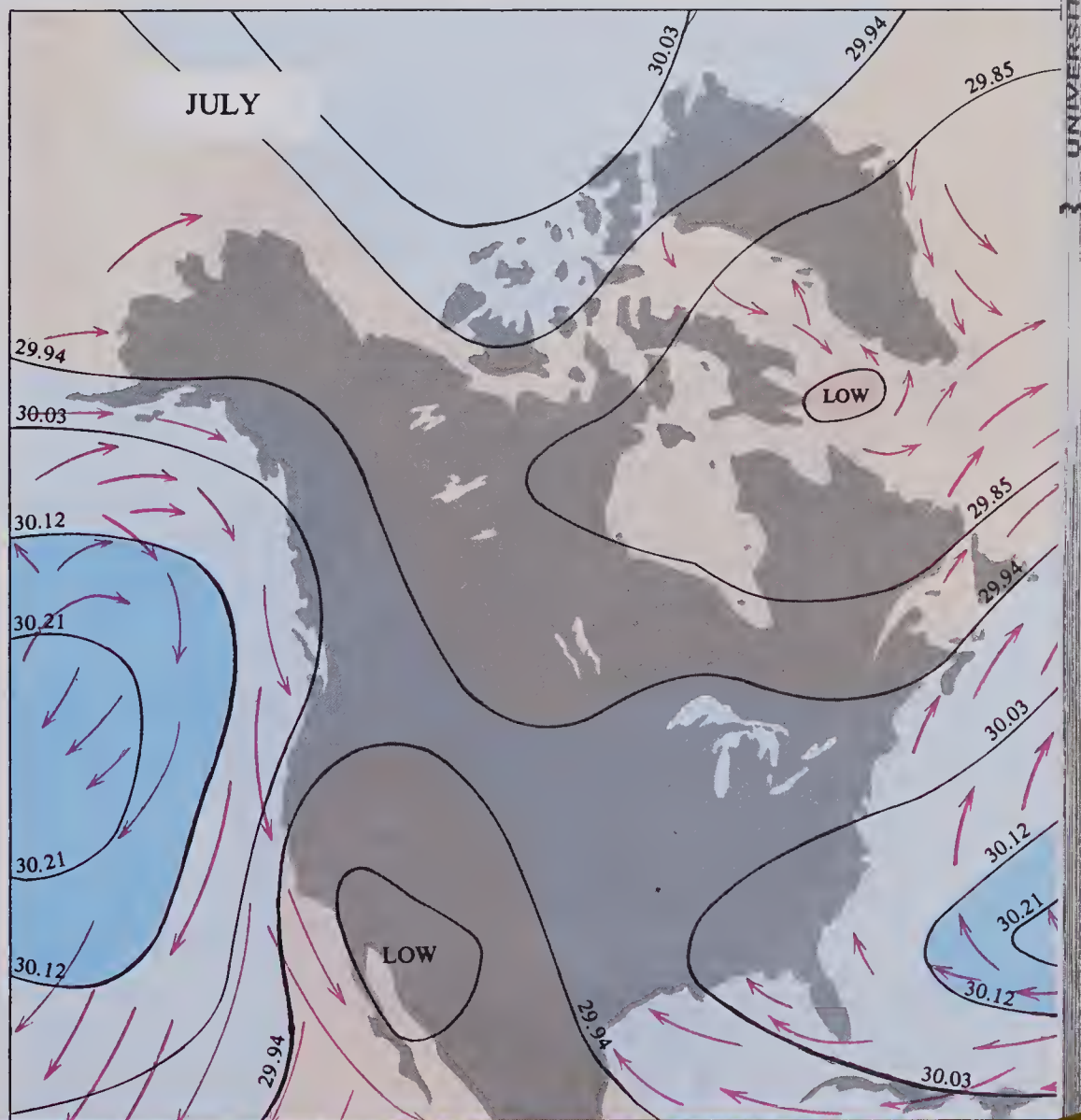
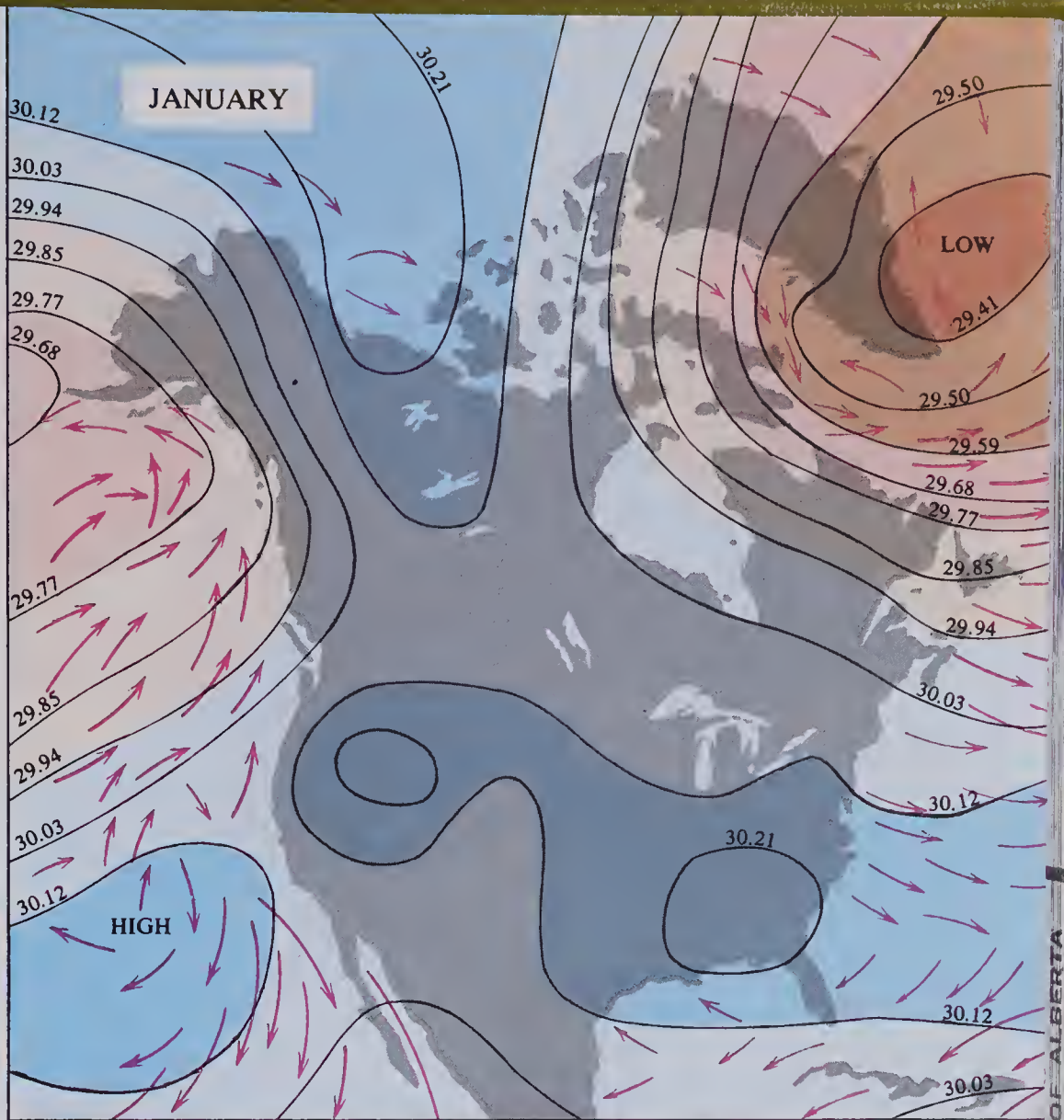




# ATMOSPHERIC PRESSURE AND PREVAILING WINDS IN UNITED STATES AND CANADA



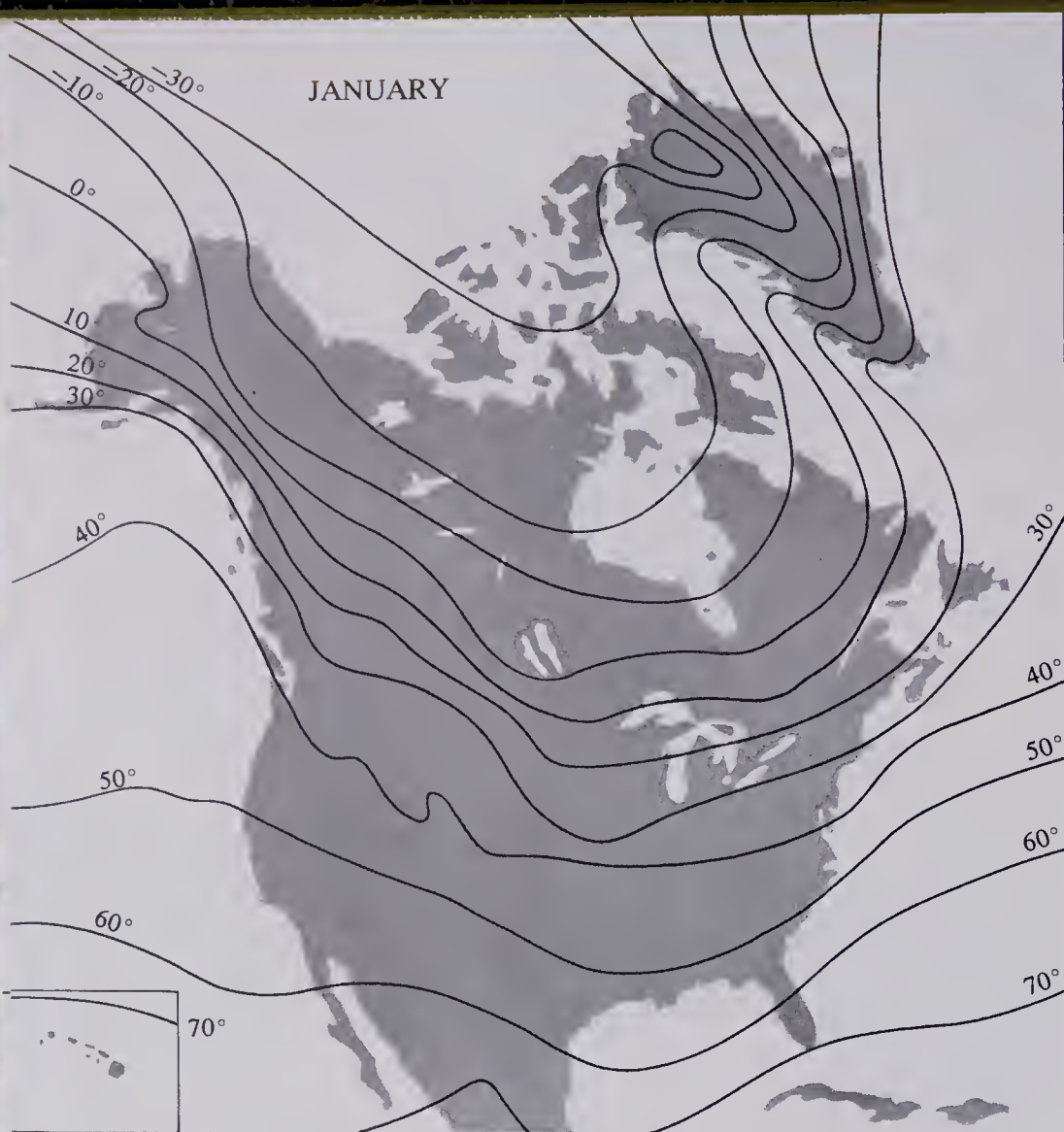
Isobars (inches)  
Prevailing winds



Air generally moves from high pressure areas toward low pressure areas. Winds do not, however, blow directly or in a straight line from a high to a low. Do you remember why?



JANUARY



AVERAGE  
TEMPERATURES  
IN  
UNITED STATES  
AND CANADA

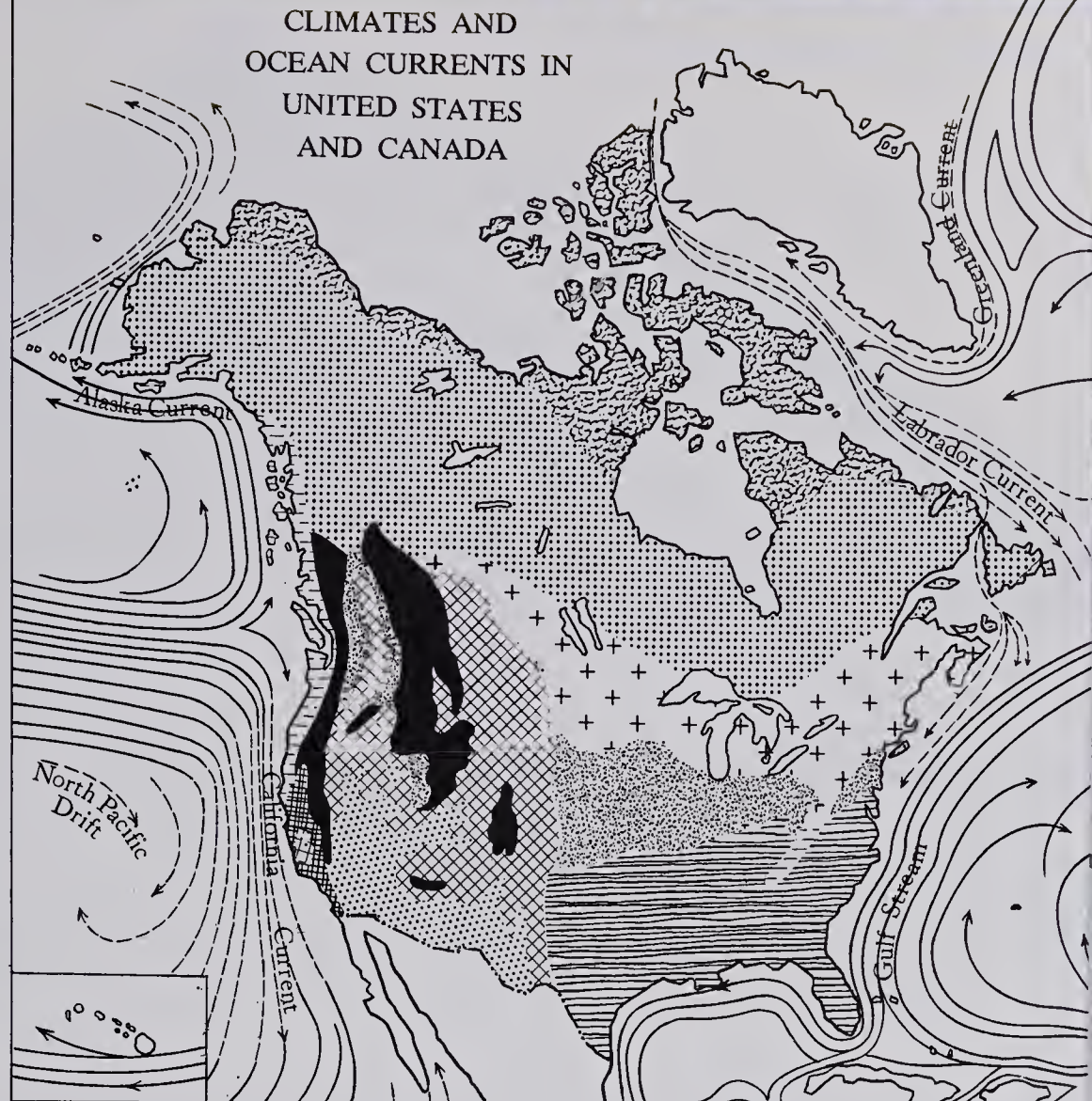
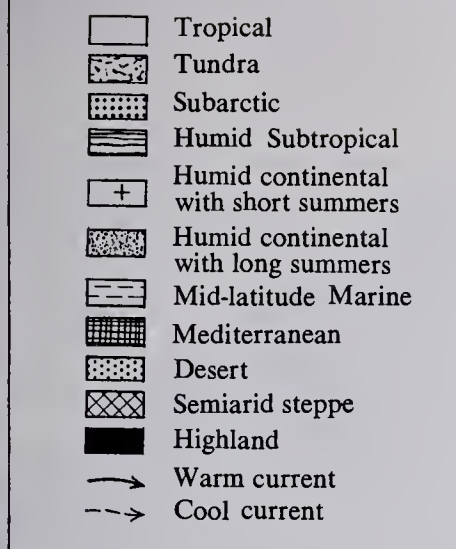
— Isotherms at  
10 degree  
intervals

Temperatures of a region are affected by many influences; among them are its latitude, how near or how far it is from a large body of water, and its altitude above sea level.

JULY







Almost all types of climate known to man are found in mainland United States and Canada. What kind of climate prevails where you live?

**The Appalachian Highlands and Coastal Plains.** East of the North American Plain and the Canadian Shield are the Appalachian Highlands. They extend from northern Alabama northeastward through Newfoundland. The highest peak in the Appalachian Highlands is Mount Mitchell in North Carolina, which is 6,684 feet high. Most of the peaks in the ranges are from 2,500 to 4,000 feet in altitude. The Highlands are considerably lower in altitude than the Rocky Mountains.

East of the Appalachian Highlands in the United States is a narrow, high plateau known as the Piedmont. To the east and south of the Piedmont is the Gulf-Atlantic Coastal Plain. Find both these regions on the map on page 197. Between the Piedmont and the lower plain is the **fall line**, where the steep descent causes swiftly flowing rapids in the streams. The fall line marks both the upward limit of navigable

water in the rivers, and also the point where water power can easily be harnessed.

**The Climate.** Because of the extent of the area covered by the United States and Canada, and the considerable differences in altitude from place to place, climates differ widely. The southernmost part of the United States, Hawaii, is mainly in low latitudes and has a climate similar to that of the West Indies. Trade winds and tropical sunshine give the islands of Hawaii a pleasant climate throughout the year. Climates on the mainland of the United States and in Canada include every known type except tropical.

The northern parts of Alaska and Canada have a *tundra climate*. In these areas, the ground is frozen throughout the year except for the summer months when the ground near the surface thaws briefly. Mosses, lichens, and a few bushes grow there. South of the tundra zone is an area



with a *sub-arctic climate*, which is not quite as cold as the tundra climate. A sub-arctic climate is one with long, cold winters and short, cool summers. Much of this area, which extends across most of Alaska and northern Canada, is covered with forests of evergreen trees which are *coniferous*, or cone-bearing.

Most of the eastern half of the United States and Canada, south of the sub-arctic zone, has a *humid climate*. The northern part of this area has a *humid continental climate with short summers*. In this climate, summers are warm and winters are long and severe. Although in areas along the coast rainfall is evenly distributed throughout the year, some places farther inland have dry periods during the winter. Farther south is an area having a *humid continental climate with long summers*. These areas have hotter and more moist summers, and winters which are cold but less severe, than those farther north. Some places have evenly distributed rainfall, while others have changing periods of humidity and dryness. In the southern part of the United States is a region with a *humid sub-tropical climate*, having long, hot summers and cool winters with occasional snow. Rainfall is evenly distributed throughout the year. Do you remember a region in Latin America which has this kind of climate?

Other types of climate are found in the western half of the United States and Canada. Along the west coast from southern Alaska to northern California is a region with a *mid-latitude marine climate*, like that in southern Chile. Farther south along the coast is a region with dry summers and moist, cool winters. Do you remember what this climate is called? Some parts of the southwest have a *desert climate*. Most of this region, however, is *semiarid steppe* which means, as you may remember, a partly dry area where desert-

like plants and grasses grow. In the west, much of this steppe is covered with sagebrush, buffalo grass, and cactus. On the mountains, which rise abruptly from the plains and plateaus in the west, a *highland climate* prevails. Do you remember what a highland climate is like?

**Population.** About 212 million people live in the United States and Canada. If the population were evenly distributed across this vast area, about 28 people would live on each square mile of land. As the map on page 204 shows, however, the population is of greatest density in the humid eastern sections of the two countries and along the Pacific Coast. As the map also shows, few people live in northern Canada and northern Alaska. By far the largest number of Canadians live within 200 miles of the country's southern border.

Population is growing quite rapidly in both countries. As the charts on page 217 show, population in the United States grew from about 76 million in 1900 to about 180 million in 1960. It is expected to reach 195 million in 1965. During the same period of time population in Canada grew even more rapidly, increasing from about 5 million to about 18 million. It will reach 20 million in 1965. Although Canada has slightly more land than the United States, the United States has a much larger population. The United States has about 50 persons per square mile while Canada still has fewer than 5 people per square mile!

The majority of the people are descendants of Europeans who came to the New World seeking a better life. Many of the immigrants came from Western and Northern Europe, but large numbers of them also came from Southern and Eastern Europe. The population of both countries also includes descendants of people from Africa and Asia. Many more people from these





# NORTH AMERICA

0 350 700

Scale 700 miles to one inch

ICE AND SNOW

TUNDRA

DRY GRASSLAND

EVERGREEN FORESTS

DESERT

FORESTS

FARMLAND

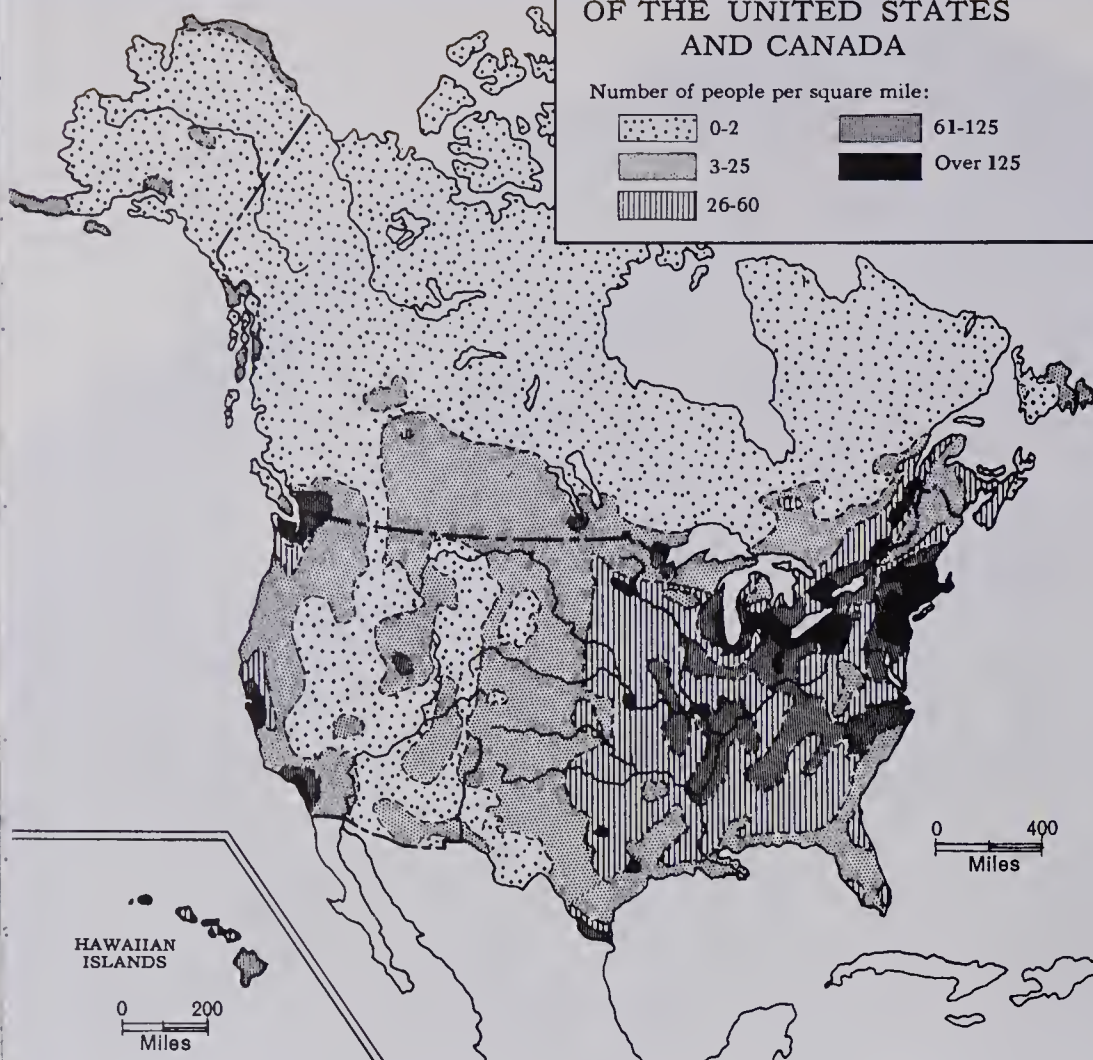
GRASSLAND

MOUNTAINS



# POPULATION MAP OF THE UNITED STATES AND CANADA

Number of people per square mile:



This map shows that the greatest number of people live in the eastern portion of the United States and Canada and along the Pacific Coast.

two continents live in the United States than in Canada. Among the people in both countries are descendants of native Indians, including Eskimos in the far north.

In both countries, the population is largely concentrated in urban centers; more than two-thirds of them living in cities. Large cities exist in both countries, but eight cities in the United States are larger than the largest city in Canada. There are many more large cities in the United States than in Canada.

**Likenesses and Differences.** The people of the United States and Canada are alike in many ways. They are similar in their *language and religion*. Most of the people in the United States and Canada speak English. In one Canadian province, Quebec, the people are French-speaking, but most of them also speak English. Although minor differences in pronunciation and speech habits exist from one place to an-

other in the two countries, almost everyone can understand and speak to everyone else. This ability to communicate across the borders of the states and provinces and across the national boundary helps tie the countries together.

Many different religions are found in both the United States and Canada. There are more Protestants than Catholics in each country. Among the largest churches in Canada are the Roman Catholic, the United Church of Canada, and the Anglican Church of Canada. In the United States, the largest church groups are the Roman Catholic, Baptist, Methodist, and Lutheran. Many Jewish people also live in the United States and Canada. Complete religious freedom is assured every citizen in both countries.

*Economic life* is similar in both the United States and Canada. Most city dwellers work in manufacturing plants or



President Johnson and Prime Minister Pearson of Canada are shown before conferring. Relations between the United States and Canada have been friendly and peaceful for many years.



in service or sales occupations. Most of the people living in rural areas use modern machines and scientific methods of agriculture. People who live in rural areas have most of the comforts of living enjoyed by city dwellers. Both groups enjoy mail service, radio and television programs, canned and frozen food, automobiles and trucks, electric lights and telephones. The great differences in living standards which exist in Latin America between urban and rural areas are not common in the United States and Canada.

Both the United States and Canada use a monetary, or money, system based on dollars and cents. In recent years, a dollar usually has been worth about the same amount in either country. Tourists who travel across the border may use the money of their own country, but it may be worth a few cents more or less than at home.

In contrast to most countries in Latin America, both the United States and Canada enjoy *political stability*. Canada has a Parliamentary system of government with a House of Commons and a Senate. The House of Commons, whose members are elected by the people, has much more power than the Senate, whose members are appointed for life. Canada is a member of the Commonwealth of Nations, and the people recognize Queen Elizabeth II as their queen. The Prime Minister, however, is the actual head of the Canadian government. He is the leader of the party with

the most members in the House of Commons. The Prime Minister has a Cabinet of Ministers, who are members of his own party, to help him administer the government. If the party in power loses an election, the Prime Minister and the Cabinet Ministers lose their positions and the leader of the victorious party assumes power. Changes in such political leadership are made with good will and cooperation.

The United States has a Federal system of government with two Houses of Congress. Members of the larger body, the House of Representatives, are elected every two years; membership of the House is determined on the basis of population. Members of the Senate are elected for six-year terms; each state has two senators regardless of its population. Executive power in the United States government is centered in the President who is elected every four years by vote of the people. The Vice-President is elected also by the people. The President selects men to serve as advisors in his Cabinet; usually, but not always, choosing members of his own party. As in Canada, changes in the government of the United States brought about by electing a different president and different legislators are made smoothly.

Both countries have Supreme Courts which head the judicial systems. Both nations have had stable, responsible government for many years.

Both the United States and Canada have



## MAJOR HIGHWAYS



## MAJOR TRANSPORTATION ROUTES AND CENTERS IN UNITED STATES AND CANADA

- Roads
- Railroads
- Navigable rivers and inland waterways
- Canals
- Transportation center
- Major Port and Transportation center








These maps show where the major railroad, highway, and inland waterway systems are located in the United States and Canada. Note that extensive highway and railroad systems are found in areas that are heavily populated.

## MAJOR RAILWAYS AND INLAND WATERWAYS





# LAND USE MAP OF UNITED STATES AND CANADA

-  Land unused or slightly used
-  Mixed family farming and cash crops
-  Grazing
-  Cash crops
-  Lumbering
-  Industrial regions
-  Mineral products



This map shows the principal ways that land is used in the United States and Canada.

developed a high standard of living by *efficient use of available natural resources*. The main reasons for this efficiency are that (1) science and technology have been utilized whenever possible, and (2) companies and farmers who wish to make money must operate efficiently. Unfortunately, some resources in both countries are being used up at alarming rates. Although the timber resources of Canada seem limitless and those of the United States vast, easily harvested trees are being cut more rapidly than they are being replaced. Many mineral resources, too, are being extracted at rates which are almost unbelievable. Some people are beginning to wonder whether the high standard of living enjoyed today in both countries will result in poverty for future generations. Certainly, both nations must be concerned about wise use and conservation of water, soil, forests, and mineral resources.

Differences between the countries and the two peoples, of course, exist. Some of these were presented as the similarities were discussed. Although Canada has fewer people than the United States, the Canadians are proud of their country and their independence. The two nations usually get along quite well, but they occasionally get into heated arguments and take quite different positions. A good way to illustrate this point is to note the different positions taken by the two nations toward Castro's government in Cuba. The United States, as this book was written, had broken diplomatic relations with Cuba and stopped all official trade with that country. Canada, on the other hand, had maintained relations and had not reduced its trade with Cuba. Whether or not the two positions were good ones for the governments to take, this example shows that they sometimes do not agree on certain issues.



## QUESTION BOX

32

1. Why is the term *Anglo-America* sometimes used to describe the region on the North American continent north of Mexico? Why is Mexico not included in this region?
2. Why is it important to learn more about the United States and Canada? Give several reasons.
3. What are the four main regions in the United States and Canada?
4. What major rivers drain the mountain and plateau region in the western part of the United States and Canada?
5. In what direction does the North American Plain slope? How can you determine this by studying a map?
6. What important resources are found in the Canadian Shield?
7. What is the fall line and of what importance is it?
8. What are the characteristics of a mid-latitude marine climate? a humid continental climate with short summers? a humid continental climate with long summers? a humid sub-tropical climate?
9. In what areas of the United States and Canada do most of the people live?
10. Where did most of the people or their ancestors come from?
11. In what ways are the two countries similar? In what ways are they different?

## GLOBE AND MAP ACTIVITIES

1. Which meridian of west longitude crosses Canada, the United States, Cuba, Colombia, and Peru? Where is most of North America in relation to this meridian? Where is most of South America in relation to this meridian?

2. About how many miles is it on 150° West Longitude between North America and Antarctica? About how many miles is it on 90° West Longitude between the two continents?

3. About how many miles is it on 60° North Latitude between North America and Asia? About how many miles is it on 10° North Latitude between the two continents?

4. What areas of the United States and Canada have rainfall of more than 40 inches during the six months of summer?

5. (a) What parts of the United States and Canada have January temperatures which average 60° or more? (b) What parts of the United States and Canada have January temperatures which average 0°? (c) What parts of Canada have January temperatures which

average - 30°? (d) Does any part of the United States have January temperatures which average less than - 30°?

6. In what directions do prevailing winds blow at each of the following places during January and July? (a) Mississippi Delta; (b) Florida; (c) the southern coast of Alaska; (d) the southern coast of California; (e) Gulf of St. Lawrence.

7. About how far is it: (a) from Point Barrow, Alaska, to Miami, Florida? (b) from St. John's, Newfoundland, to San Diego, California? (c) from the most northern point on Ellesmere Island to Brownsville, Texas? (d) from Nome, Alaska, to Boston, Massachusetts?

8. Which has more people per square mile: (a) Northern Canada or Alaska? (b) The coastal area north of Lake Erie or the coastal area south of it? (c) The Rocky Mountain area in Canada or in the United States? (d) The coastal area of the Gulf of Mexico or the coastal area from Cape Cod south to Baltimore?



9. Be prepared to show on a large wall map two routes by which coffee from Santos, Brazil, could be delivered by water transportation to: (a) Chicago, Illinois; (b) San Francisco, California; (c) Anchorage, Alaska.

10. Which is closer to one of the poles: (a) the northern coast of Ellesmere Island or the southern tip of South America? (b) Punta Arenas or Fairbanks? (c) Buenos Aires or Ottawa? (d) Buenos Aires or New York City? (e) São Paulo or Los Angeles? (f) Brasília or Washington, D.C.?

11. Where in the United States and Canada would you go: (a) to start a lumber company? (b) to explore a desert? (c) to see land with very high mountains? (d) to see

land always covered by snow and ice? (e) to find grassy prairies? (f) to swim and go sunbathing in midwinter? (g) to ski during winter months?

12. Where in the United States and Canada is land: (a) slightly used or unused? (b) used primarily for cash crops? (c) used mainly for cities and manufacturing? (d) used mainly for grazing? (e) used mainly for lumbering?

13. Is any part of South America straight south of Montreal, Canada?

14. Is any portion of South America farther east than St. John's, Newfoundland?

15. What important line is drawn on globes north of Port Radium and across the Great Bear Lake?

## OTHER LEARNING ACTIVITIES

1. Make a special study and prepare a report on one of the following subjects, either alone or with a group: (a) Early voyages by explorers to the Atlantic and Pacific coasts of the United States and Canada; (b) Early inland explorers of the United States and Canada; (c) The British in the United States and Canada; (d) The French and Indian Wars; (e) 54-40 or Fight!; (f) Indian tribes of the United States and Canada; (g) Major rivers used for shipping in Canada and the United States; (h) Cities in the United States and Canada with more than 2,000,000 people; (i) Automation and the use of machinery in agriculture in the United States and Canada; (j) Transportation systems in the United States and Canada; (k) Bird migration in North America; (l) The submarine route around northern North America; (m) The United States and Canada in World Wars I and II.

2. Make two charts, the first showing in order of land area the five largest provinces (or territories) in Canada and the five largest states in the United States. Total this amount of land area for each country. On the second chart, show the population of the five most populous states and provinces, and this total population for each country. Then, develop several generalizations as you study the two charts.

3. Collect weather maps of the United States and Canada from daily newspapers or the nearest weather bureau. Study these maps to see how they indicate the weather which you experience in your community. Attempt to predict the weather for your community from your study of the maps.

4. Make a study of the air movements and weather in the Northern Hemisphere. This information may be found in encyclopedias under headings such as *air* and *weather*, and in books on weather. Present your findings to the class.

5. Prepare circle or bar graphs for both the United States and Canada, showing the composition of the population of each country on the basis of (a) age; (b) per cent urban and rural; (c) per cent male and female; (d) racial background; (e) nationality background; (f) religious affiliation.

6. Join a group to learn what you can about the "free enterprise system" of economics as it operates in the United States and Canada. Compare this system with the system now used in the U.S.S.R.

7. Join a group to prepare a report on "Human and Natural Resources of Canada and the United States—Their Use and Misuse." Conclude your report with recommendations on how your class can help reduce the waste of valuable resources.









# THE UNITED STATES

The United States of America is a nation of 50 states, 48 of them clustered together between the northern border of Mexico and the southern border of Canada. Until 1959, there were only 48 states, but in that year Alaska and Hawaii achieved statehood in the Union. Today, in addition to its 3,615,206 square miles of land and lakes, the United States has about 13,000 square miles of territory for which it is responsible. Most of this area is made up of small islands in the western Pacific, which the United States administers as a trust territory for the United Nations. The additional territory also includes Puerto Rico, the Virgin Islands, the Corn Islands, and the Canal Zone. Only three nations in the world have a larger land area than the United States. Do you know which nations they are?

The United States has not always been this large. In 1790, when George Washington became the first president of the United States, the country had less than 900,000 square miles of territory. The size of the nation almost doubled in 1803, when President Jefferson signed the Louisiana Purchase agreement with France. Through-

out the 19th century, the United States continued to add large amounts of land to the territory, as the map on page 214 shows. Florida was purchased from Spain. The land which is now Texas seceded from Mexico and joined the Union. A dispute over its boundaries led to the Mexican War in which the United States won most of the land in the southwest. The United States paid Mexico \$15,000,000 for land west of the Rio Grande. The boundaries of the Oregon Territory were fixed in treaties with Great Britain and Spain. Alaska was purchased from Russia, and Puerto Rico, Guam, and Hawaii were acquired in 1898. In 1899 American Samoa became a territory of the United States.

Some other countries, particularly the U.S.S.R. and China, have acquired large amounts of land in the 20th century. The United States, however, actually has less land area than it had in 1900. At that time, the Philippine Islands were owned by the United States. These islands were granted their independence in 1946 and now are an independent nation, the Republic of the Philippines. Since 1900, the only territory added to the United States is the Virgin





Castle San Marcos, built by the Spanish at St. Augustine, is now a national monument.

Islands. The Canal Zone has been leased from the Republic of Panama, and the small Corn Islands in the Caribbean Sea have been leased from Nicaragua.

**Early History.** As in Central and South America, the Spanish were the first Europeans to explore areas which are now part of the United States. The Spanish explorers were looking primarily for gold, silver, and other riches. Among these men were Hernando de Soto who explored the south-east and discovered the Mississippi River, and Francisco Coronado who explored the southwest. In 1519, the Spanish founded a small settlement at St. Augustine, Florida, which is now the oldest city in the United States. About 90 years later, in 1609, the Spanish established a settlement at Santa Fe, New Mexico. Explorers continued to look in that area for fabled cities of gold, but without success. Instead, they found Indian tribes raising corn and other grains in the region.

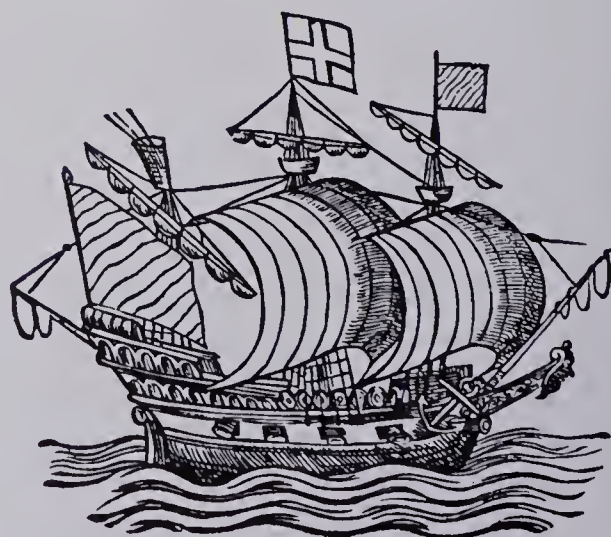
Soon after the Spanish began to settle in Florida, French explorers and settlers moved into land, now part of Canada, near the St. Lawrence River. They established several outposts and began a fur-trading business with the Indians. The furs were shipped to Europe, where they were in great demand for making coats and hats. The French and Spanish colonies grew very slowly because both were based upon

exploitation, or use of the resources of the new land to benefit the older countries in Europe. Colonists in lands controlled by France or Spain were not allowed to take part in governing the colony. Settlers had little or nothing to say, even about the small matters in their own villages. Few settlers were able to own land.

In 1607, the first successful British colony was established in North America. A small band of 104 people crossed the Atlantic in three small boats, and settled at Jamestown, Virginia. These people came to the New World planning to stay as permanent settlers, but their first two or three years at Jamestown were years of great hardship. For a time, it appeared that they might be as unsuccessful as an earlier group of English settlers which had failed to start a colony on Roanoke Island. After a few years of difficulty, however, the colony in Virginia began to prosper.

A poster, published in London in 1609, tells of the opportunities awaiting new settlers.

**NOVA BRITANNIA.**  
**OFFERING MOST**  
 Excellent fruites by Planting in  
**VIRGINIA.**  
 Exciting all such as be well affected  
 to further the same.



LONDON  
 Printed for SAMUEL MACHAM, and are to be sold at  
 his Shop in Pauls Church-yard, at the  
 Signe of the Bul-head.  
 1609.



- ..... Leif Ericson (1000?)
- Columbus 1492
- x-x- Columbus 1498
- |-|- Alonso de Ojeda 1499
- +|-+ Pedro Cabral 1500
- |-|- Juan Diaz de Solis 1508
- Balboa 1513
- ..... Pizarro 1531-32
- Magellan 1519-21
- .-.- Cartier 1534
- Cortes 1519
- ||-||- Champlain 1604

This map shows the routes of the Europeans who first explored the Americas. You will learn about the lands these explorers discovered.



Captain John Smith provided effective leadership for the settlers, and their farms soon were producing good crops. Tobacco, which had been introduced to Europe, soon became a major cash crop of the Virginia colony. More settlers from England came to the colony and the population grew rapidly.

Another group of English settlers who were important in the early development of the nation arrived at Cape Cod Bay,

Massachusetts, in 1620. The *Mayflower* brought 102 Pilgrims, as they called themselves, to the New World. The Pilgrims, who had experienced persecution in both England and the Netherlands, were seeking a home where they could worship God as they chose. Other settlers from England soon followed the Pilgrims. In 1630, almost 1,000 people crossed the Atlantic to the new colony of Massachusetts. Because the settlers had large families, and because

The *Mayflower II* is a copy of the ship that brought the Pilgrims to Plymouth in 1620. *Right.* The colony, as it may have looked in 1627, has been reconstructed in recent years near Plymouth, Massachusetts.





# GROWTH OF THE UNITED STATES



ROUTES OF THE WESTWARD MOVEMENT



more families continued to move to Massachusetts from England, the population grew rapidly.

Other settlements also were started along the eastern coast. William Penn established a Quaker colony in Pennsylvania. Roger Williams, who was forced to leave the Massachusetts colony because of his religious beliefs, founded a colony in Rhode Island. The Dutch began a small settlement where New York City now stands. Colonies in Maryland, South Carolina, Georgia, and North Carolina all were started by small groups of settlers looking for freedom and opportunity. For many years, the British permitted the colonists a great deal of political freedom. Trade with the colonies, however, was controlled by England. At first this worked to the advantage of both groups; later, it became a source of conflict.

Late in the 17th century, several wars broke out between the British and French because of their conflicting claims for the vast territory of northern North America. Fur-trading had become very profitable, and both countries wanted to control the area. The British had almost twenty times as many colonists in North America as the French when the first war started in 1689. Although the outcome of the wars, therefore, was almost certain to be in favor of the British, the French persuaded many Indians to join them in fighting the British. As a result, these wars are known as the French and Indian Wars. In the fourth and last of these wars, the British soundly defeated the French and won control of all the land east of the Mississippi River.

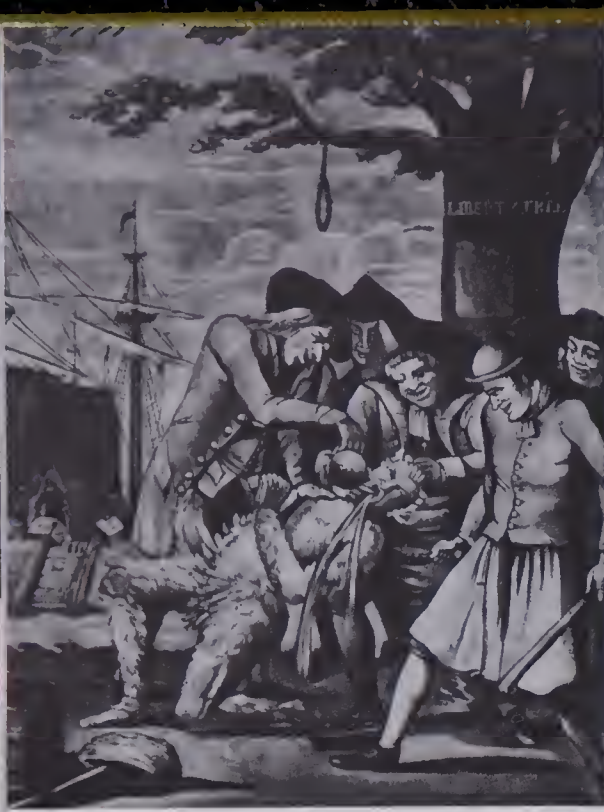
By 1765, the English colonies in the land which is now the United States began to resent British control of their trade. In that year, the British Parliament passed a Stamp Act. It was designed to force the colonists to pay a larger share of the cost of administration and defense. Since the colonists did

not have any representatives in the British Parliament, they objected to "taxation without representation." Feelings against British rule continued to mount. Angry citizens in Boston, objecting to a shipment of taxed tea from England, threw the tea into Boston Harbor — an incident known in history as the Boston Tea Party. The British Parliament then passed laws to punish the people of Boston.

In 1775, the first shots were fired in what is now known as the Revolutionary War or the War for Independence. About a year later, on July 4, 1776, the colonists joined in a Declaration of Independence from British rule. For several years the colonists and the British fought almost on equal terms. Then it appeared that the ragged, poorly equipped colonists could not possibly win their fight for independence. The French people, however, remembering their earlier defeat by the British, sent men, ships, and supplies to help the struggling colonies. In 1781, George Washington and his armies, with help from the French army and navy, surrounded the main British army at Yorktown, Virginia. After a siege of several weeks, the British army surrendered. Although some fighting continued farther south for a short period of time, the surrender at Yorktown signalled the end of the war.

A few years after the close of the war, representatives from the thirteen colonies together wrote the Constitution of the United States. This document guaranteed certain rights to the states and to individual citizens of the country. It assigned certain responsibilities to the central government. The Constitution provided for a President to be elected by the people and for lawmakers also to be elected by them. Each state was allotted two Senators, while representation in the House of Representatives was to be based upon population. A Supreme Court of the United States also





A cartoon, published in London in 1774, shows Bostonians giving the tax collector a drink of tea, rather than pay any taxes on it. *Right.* An English engraving shows British forces making an attack on Breed's Hill, 1775.

was established to interpret laws and guarantee justice for all.

In 1789, the colonies ratified or accepted the Constitution and it became the basic law of the land. George Washington was elected the first president. For a time, New York City was the capital of the young republic, but in 1790, the seat of government was moved to Philadelphia where the Declaration of Independence had been signed. In 1800, the capital was moved again — this time to its present site, Washington, District of Columbia.

From its early beginnings as a group of thirteen loosely joined colonies, the United

This old print from a newspaper shows a parade and cheering crowds celebrating the ratification of the Constitution.



States of America has become a great and powerful nation. Between 1861 and 1865, the North and South fought over the issue of secession, or whether states could withdraw from the Union if they did not like certain laws. Slavery in the South had led to the issue of secession. After a long and bloody war, the Union was preserved. Since that time, progress has been extremely rapid. Together, the people have built the world's richest and most powerful nation.

Note the graphs to the right. They show the changes in the size and population of the United States as it grew from the time of the ratification of the Constitution to 1950. Notice that the graph of the population growth shows steady increases every 20 years while the increases in land area are irregular. Some of the most important increases in land area were: the Louisiana Purchase in 1803; Texas in 1845; Oregon Territory in 1846; Alaska in 1867; and Puerto Rico, Hawaii, and the Philippine Islands in 1898. Find where these acquisitions fit into the graph. In what year was there a slight decrease in land area? Why?



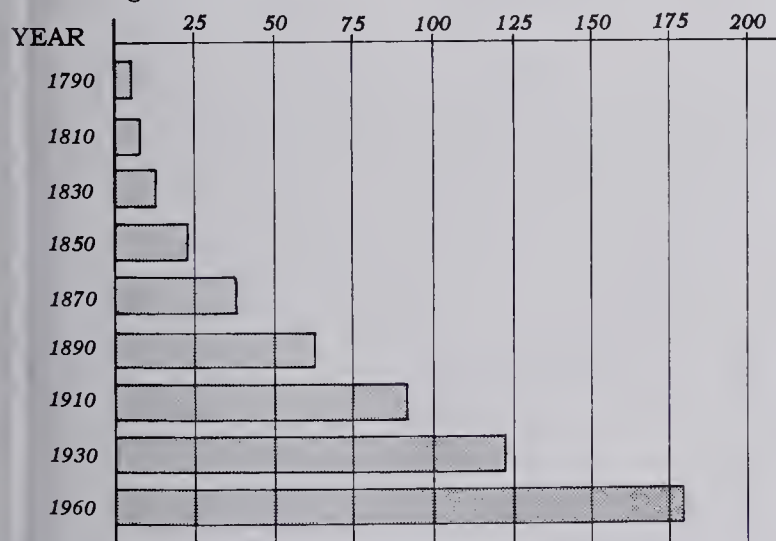


**EMIGRANTS**  
LOOK TO YOUR  
**INTEREST**  
**FARMS AT \$3. PER ACRE!**  
AND NOT A FOOT OF WASTE LAND.  
**FARMS ON TEN YEAR'S CREDIT!**  
And on purchase no portion of the principal required!!  
**Lands not Taxable for Six Years!**  
**FARMING LANDS IN**  
**EASTERN KANSAS**  
RIT ONE HOUR'S RIDE FROM THE CITY OF ATCHISON AND THE MISSOURI RIVER ARE OFFERED ON TERMS WHICH GUARANTEE TO THE ACTUAL SETTLER LARGER REVENUES THAN CAN BE SECURED UNDER THE HOMESTEAD ACT.  
**THE CENTRAL BRANCH**  
**UNION PACIFIC RAIL ROAD CO.,**  
Offer for sale their lands in the celebrated  
**KICKAPOO INDIAN RESERVATION,**  
Situated in the counties of Atchison, Brown and Jackson, in the State of Kansas, the land of the CENTRAL BRANCH UNION PACIFIC RAIL ROAD CO. is offered for sale under the Homestead Act.  
**152,417 ACRES.**

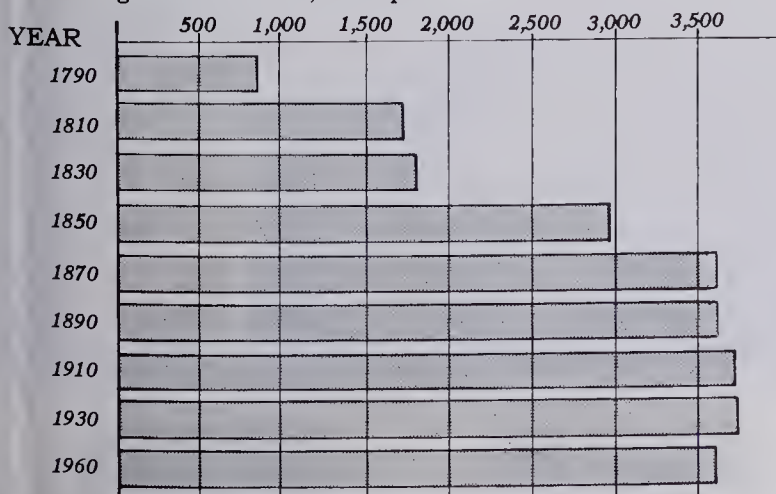
In the fifteen years following the Louisiana Purchase, New Orleans tripled in size and became one of the world's leading ports. In 1867, people from the east were encouraged to settle in Kansas by posters such as this.

## INCREASE IN POPULATION AND LAND AREA OF THE UNITED STATES, 1790-1960

**POPULATION GROWTH**  
Figures shown in millions



**INCREASE IN LAND AREA\***  
Figures shown in 1,000 square miles



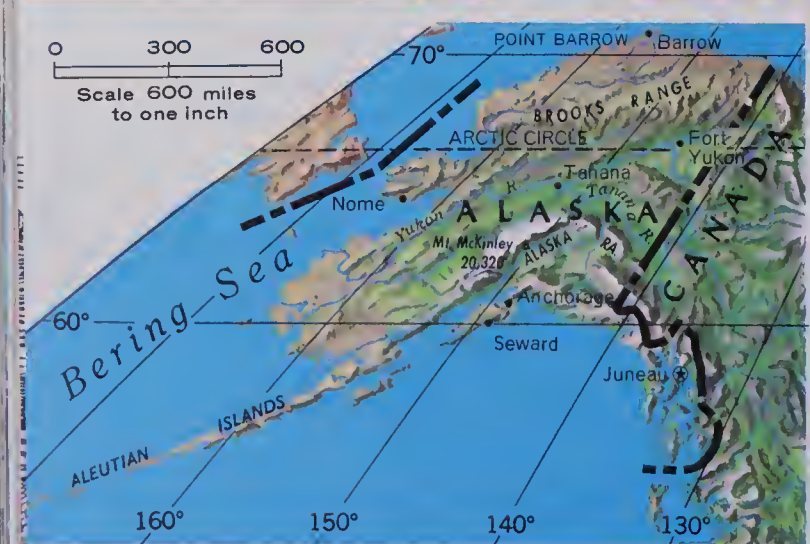
\*Includes territories controlled by the U.S.A. at that time.

## QUESTION BOX

33

1. By about how much did the size of the United States increase in 1803?
2. What island-nation, formerly owned by the United States, is now an independent country?
3. In what state is the oldest city in the United States? What is its name?
4. Why did the population of the colonies settled by the English grow more rapidly than those settled by the French or the Spanish?
5. What was the first successful cash crop raised in the Virginia colony?
6. Which nation — France, Spain, or Great Britain — permitted its colonists the most political freedom?
7. What part of North America came under British control at the end of the French and Indian Wars?
8. Why did the colonists object to the shipment of taxed tea?
9. What nation helped the colonists to win the War for Independence?
10. In what year was the Constitution accepted by the colonies?





TUNDRA

EVERGREEN FORESTS

FORESTS

GRASSLAND





# THE UNITED STATES

0 100 200  
Scale 200 miles to one inch  
Lambert Conformal Conic Projection

DRY GRASSLAND

FARMLAND

219

DESERT

MOUNTAINS

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REVISED 1965



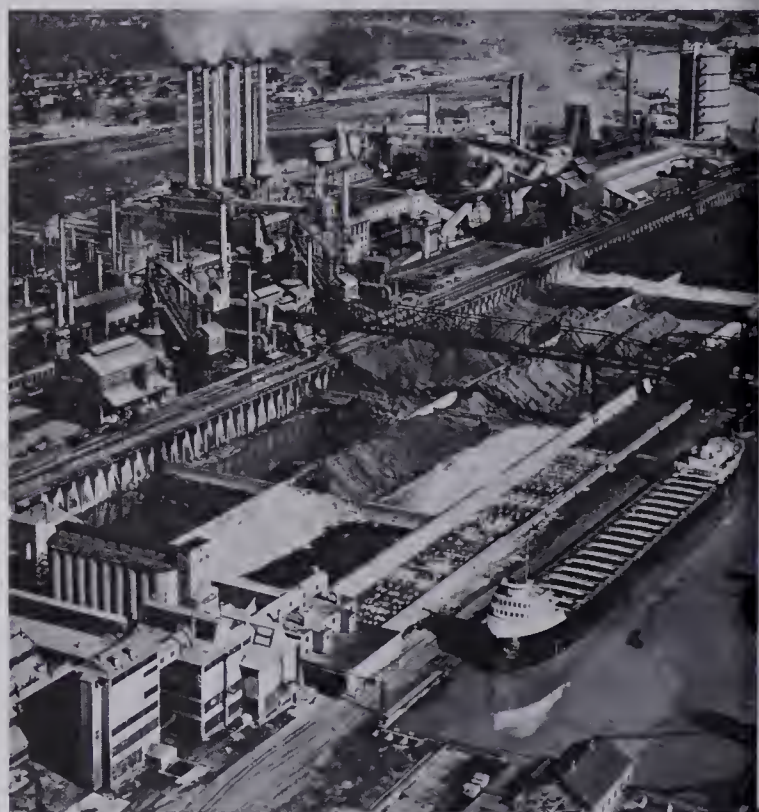
**Why the United States Has Become Rich and Powerful.** The United States is not only a large country, but also is a nation with rich natural resources. Great mountains, high plateaus, rolling hills, and wide plains make up its surface features. Lakes, waterfalls, deep canyons, and winding streams add to its resources. The nation has vast forests, grasslands, and areas of fertile soil. Within the United States are found most of the mineral resources known to man, and new resources are constantly being discovered. The greatest resource of the United States, however, is its people. They have come to the United States from all over the world seeking freedom, justice, and economic opportunity. Working together, these people have developed the world's highest standard of living. They have built more schools, colleges and universities, churches, fine homes, and modern cities than any other people on the earth. They have built a vast transportation network to tie the nation together. Why have such achievements been possible in the United States? The following are some of the reasons why this nation has become so prosperous and powerful.

(1) **A Large Area and Population.** A great land area allows a large number of people to live and work in comfort. Large numbers of people require goods and services of all kinds. Moreover, the large land area offers the people a variety of climates, surface features, and resources which can be used to meet their needs.

Progress, particularly in manufacturing, can be accomplished more easily in a large area which includes only one country than in a similar area divided into separate countries. Separate countries often interfere with the free passage of people and goods. The great variety of goods that are produced in the United States can be moved freely from one state to another as they are needed.



Large truck gardens provide food for the population. *Below.* Abundant resources and capital make possible such an industrial unit.



Ever-changing demands and growth of the population stimulate commerce in the U. S.







The privilege of trial by a jury of his peers guards the rights of every citizen.



Goods from many regions are shipped to and from New York's harbor. *Below.* Fish are caught in many places along the coast.



(2) **Freedom and Justice under Law.** Another reason for the high standard of living attained by the United States is that the people enjoy freedom and justice under law. A person may choose any occupation he wishes and prepare himself for it. He is free to experiment, to invent, and to try to find new and better ways of doing things. A man is free to start any business and to engage in any industry he chooses, so long as it does not interfere with the health or welfare of the community.

A person is free to change from one occupation to another, or from one factory or place of business to another. He may move from one part of the country to another as he pleases. He is free to criticize other people, including government officials. He may express his views openly and strive for public office if he chooses. Whether or not he decides to go into politics, he may strive to improve his working conditions and salary or profits. Such conditions encourage people to do their best and to make a success of their undertakings.

(3) **Abundance of Natural Resources.** Citizens of the United States have been able to accomplish as much as they have partly because the nation is blessed with an abundance of natural resources. The early settlers found extensive forests and grazing lands, large areas with fertile soil, and in most places, sufficient rainfall for crops. They found rivers of fresh water which seemed never to run dry, and vast lakes. They found fish, shrimp, lobster, and other seafood in the waters near the coast and in the lakes and rivers.

As the settlers moved westward across the continent they discovered numerous animals whose meat could be eaten and whose hides could be tanned. In time, they found large quantities of the minerals needed to build an industrial nation, such as coal, iron, copper, lead, zinc, and





Wide use of machinery and assembly-line methods are common in the United States. *Top.* A power spray is used to apply a finish coat on these chair legs. *Center.* This machine produces thousands of bottles per day. *Bottom.* Hay balers and other machines have increased farm production.



petroleum. Building stone of all kinds, clay to be used in making bricks and pottery, limestone, sand and gravel, salt, phosphate rock, potash, and sulfur were also found in abundance.

(4) **Extensive Use of Machines.** The enormous output of goods manufactured in the United States would not be possible without the extensive use of machines. In many cases the total number of workers in an industry is less than it was many years ago, while the amount of goods produced is many times larger. For example, at one time about nine-tenths of the people worked as farmers to raise enough food for everyone. Now, although less than one-tenth of the people in the United States are engaged in commercial agriculture, much more food is raised each year. Such accomplishments would be impossible without farm machinery.

A few more examples will show how machines increase production. In a modern clothing factory, one girl at a machine can do the work that 25 girls used to do by hand. One man with the aid of machinery can produce 150 watches per year, while a man working by hand can make only 40. With the aid of dough-mixing machines, one man in a bakery can now do as much work as was formerly done by six to ten men. In glass factories, one machine does the work of 54 bottle-makers. The use of machinery in coal mining has nearly doubled the output per day of each miner. Machines have greatly speeded up the entire manufacturing process.

In modern factories, each of the several operations in making an article is performed by a special kind of machine. The unfinished product is easily transferred from one machine to another for each step in the process. In doing the same thing over and over, the operators of these machines become skillful and speedy in their work. This method of production makes



the output per worker much larger than it would be otherwise.

Greater production per person due to the use of machines makes it possible for workers to receive higher wages and to have a shorter working day. As a result, factory workers have more money to spend and more leisure time than their grandparents had before machines came into common use.

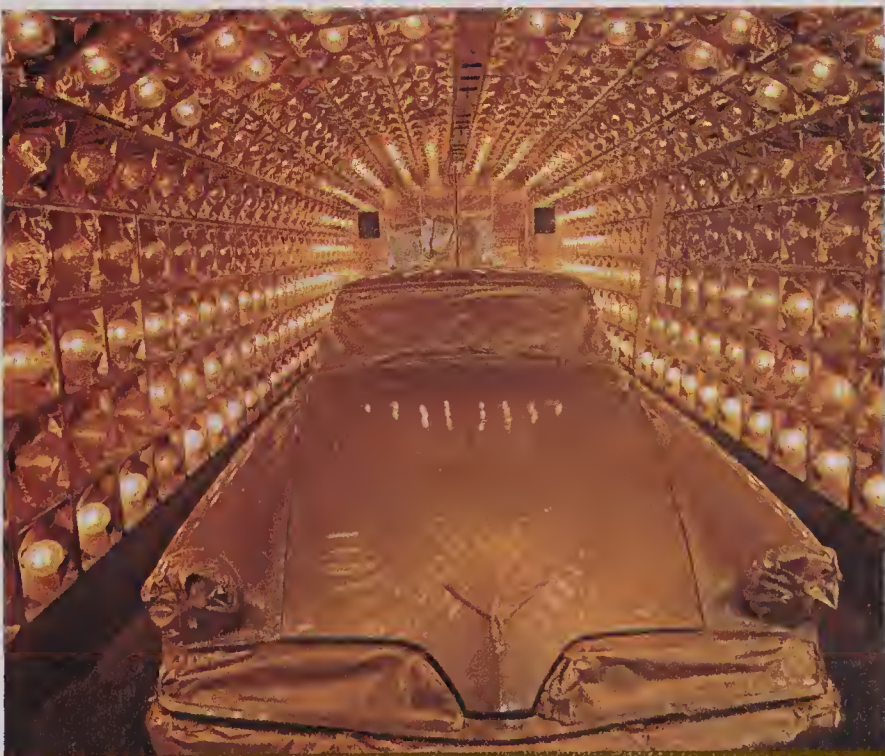
Machines tend to **standardize** a product, so that each article produced is the same. No two articles are quite alike if they are made by hand. Machine-made articles and their various parts are made, however, according to standard patterns. The machines themselves are made in the same way. If a certain part of a machine breaks, the purchaser may order a new part from the maker of the machine. The new part, if it is to fit and work well, must be exactly the same size and shape as the old part.

It is much cheaper to make a large number of standardized products than it is to make a similar number according to different patterns. Part of the saving results from more complete use of the raw materials, and part of the saving is in time and energy. Consequently, manufacturers in the United States usually make only a certain number of different sizes and styles of any product.

A large number of labor-saving devices have been invented in the United States. Several million **patents** have been issued by the United States Patent Office on new inventions. A patent in the United States gives the inventor 17 years of protection. During that time, he is the only person who can make, use, and sell his invention. Of course, many companies use machines made under a particular patent, but they pay the inventor for his idea when they buy or rent the machine. Sometimes an inventor will obtain patents in other countries as well.



*Top.* Engineers share their ideas about designs for new automobiles. *Center.* Auto bodies move along an assembly line. The man on the left is putting in springs. *Bottom.* A freshly painted car can be dried under controlled conditions in this tunnel equipped with special lamps.





(5) **Abundance of Power.** Machines are of no use without the power to run them. Different sources of power have enabled the people of the United States to make effective use of machines. Among the most important sources of power are coal, petroleum, natural gas, water, and atomic energy.

Coal is the chief source of power used in manufacturing and is the main fuel used to produce steam and electricity. The United States usually produces more than 400,000,000 tons of coal each year, or about one-fifth of all the coal mined in the world. Much of the land has coal under it; in fact, thirty-two of the fifty states have minable coal deposits.

Since the beginning of the twentieth century, petroleum more than any other fuel has speeded up the development of American industry. More than 595,000 oil wells in this country produce more than two and one-half billion barrels of oil each year! This amount of petroleum is worth about seven and one-half billion dollars, and it represents almost one-third of the petroleum production of the entire world. The United States not only produces a great deal of petroleum but also consumes or uses more than all the other countries of the world together.

Natural gas usually is found along with petroleum, but many times it is pumped from ground where petroleum is not located. Natural gas is found in nearly half of the states, but more than half of the total supply comes from Texas and Louisiana. Thousands of miles of pipelines have been laid to carry natural gas from the producing centers to other sections of the United States.

Today, water power is being developed and used more than ever before in history, because electricity can be produced through harnessing its force. The United States already has made use of about three-fourths of its water power possibilities.



Large amounts of coal are needed to keep this electric-power plant operating.



Above. A "Christmas tree" controls the flow of crude oil from a producing well. Below. When available and properly utilized, water can provide a nearly constant source of power.





Atomic energy is the latest and most powerful form of energy yet developed and harnessed by scientists. As scientists work out better ways of controlling atomic reactions, this energy source may begin to take the place of coal, gas, petroleum, and water as sources of power. Later, you will learn more about atomic energy and about the other sources of power.

(6) **Good Transportation Facilities.** A good transportation system is essential to the development of an industrial nation. The farmer must be able to get his produce to market and in turn receive other products which are manufactured in cities. The manufacturer must have his products moved from his factory to a store. He also must have the needed raw materials moved from their sources to the factory.

The people of the United States have developed one of the finest railway systems in the world. About 230,000 miles of track reach almost every part of the country. Only Alaska has large areas without rail service, although in some western states where few people live, there are areas with few railroads. A network of good roads enables thousands of motor trucks to transport goods from one place to another and serve places not reached by a railroad. Airplanes, too, are used to carry cargo, especially products which must be transported quickly.

Waterways, including canals, have also been of great importance in the development of the United States. Most of the country's cities are located either on the banks of a river or on the shores of a lake or ocean. Before railroads and roads were built, rivers were the main highways. Though some rivers are not used for transportation as much as they once were, others have gained in importance. Channels have been deepened by dredging and by building dams to raise the water level. Locks have been constructed to lift river boats



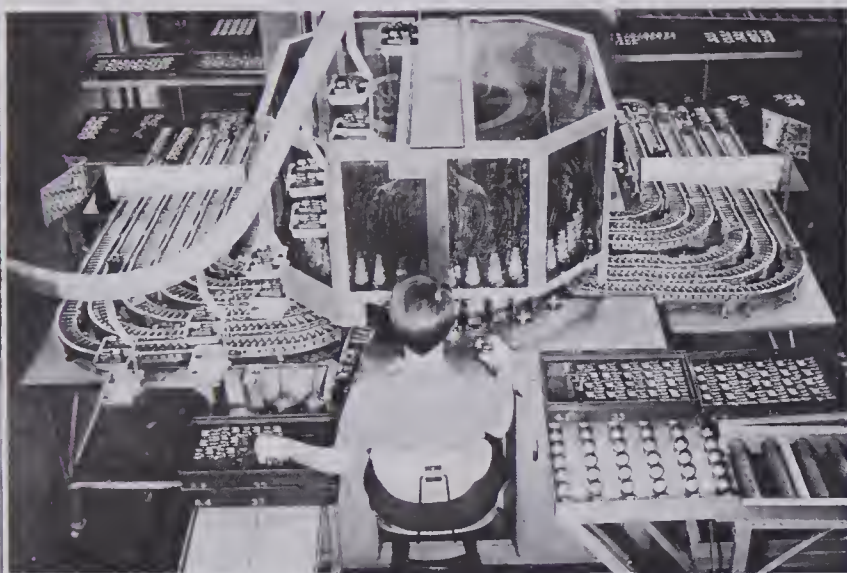
This superhighway in California helps speed traffic and movement of goods.



*Above.* Switching of freight cars in this yard is automatically controlled. *Below.* Millions of tons of cargo are moved via inland waterways. Can you name an important waterway?







*Top.* Practicing dentists learn of advances in their field by closed-circuit television. *Center.* Equipment that will be used in a telephone network is checked to prevent a future breakdown. *Bottom.* Laying the Hawaiian Cable, another link with our youngest state.



around rapids. The United States is very fortunate in having many rivers, large and small, throughout the country. It also has many lakes, especially in the north central part of the country. The Great Lakes and St. Lawrence River provide an important inland waterway, extending almost halfway across the continent, which is used extensively for transporting raw materials.

**(7) Rapid Communication.** Quick communication by telephone, telegraph, radio, television, and mail has also been a factor in the development of this large nation. Although communications in the United States are extremely rapid and effective, they often are taken for granted. Yet most of the rest of the world, and almost all of Latin America, still has a slow and often ineffective system of communication.

The telephone system in the United States is a marvelous network. Most calls now are made automatically and almost instantaneously using dial telephones. Long-distance calls can be made from most cities by simply dialing an area code number and the number wanted in any other city. Radio-telephone and cable services are available, similarly, to Hawaii.

Messages are also rapidly transmitted from one place to another in the United States by telegram. Telegrams sent from San Francisco arrive in New York City within a few minutes, and usually are delivered to the addressed person within an hour of the time filed. Almost instantaneously, radio and television report news about important events to everyone in the country. Many radio stations are also used by companies, such as taxicab companies, and by government agencies, such as the highway patrol, to speed communication. Rapid communication means better service.

Mail service in the United States also is rapid and good. An airmail letter posted almost anywhere in the nation probably will reach any city in the country which





*Top.* Residents in many cities and towns have mail-delivery service. *Center.* Basketball is a popular game throughout the United States. *Bottom.* A crowd collects on a community skating pond to enjoy a hockey game. Is this possible everywhere in the United States?



has an airport within a day. Regular mail is taken by trains and buses to every city and town. In many cities and rural areas, postmen deliver the mail to every house or mailbox. Packages as well as letters are delivered by the United States Postal Service. Mail-order companies make it possible for people to order almost any product manufactured and receive it by mail within a short time.

(8) **Energetic People.** Americans are noted for the energy and vigor with which they go about their undertakings and carry them through. Most Americans move quickly and aim to accomplish a lot of work in a short time. Their energy comes partly from a diet high in proteins, fats, and vitamins.

No other country has so great a mixture of people who represent every nationality in the world. Much of the increase in population in the United States during the past century was due to immigration. Usually, the people who move from one country to another are eager to improve their lot. The newcomers work hard to achieve a higher standard of living than they had previously enjoyed. Their vigor and drive also encourage other people to work hard.

(9) **A Stimulating Climate.** Like other countries which are located mainly in middle latitudes, the United States has a stimulating climate. Most parts of the United States have weather changes every few days, in addition to the regular seasonal changes. The weather has much influence on activities from day to day. People dress according to the weather. Outdoor work and sports are largely dependent on the daily weather as well as the season of the year. Daily changes and seasonal changes are not only stimulating, but they increase people's needs and cause them to do more work. Food crops, for instance, must be raised during the warm, growing season and stored away for use during the cold season.



Except for those living in Hawaii or far south on the mainland, many people must have heavy clothing for winter and light clothing for summer. Homes must be heated in winter and kept cool in summer.

The United States is such a large country that there are considerable differences in climate. In the South and in Hawaii, which is mainly in low latitudes, winters are mild. Changes in the weather, and especially in temperature, are not nearly so great as in the north. In southern Florida, Texas, and California frosts rarely occur, and in Hawaii they are practically unknown except on high mountain peaks.

Southern California has a Mediterranean climate with mild, rainy winters and dry, warm summers. Farther north, along the coast of Oregon and Washington, is a mid-latitude marine climate. The summer heat and winter cold both are modified by winds blowing from the Pacific Ocean. Do you remember what kinds of climate are found along the east coast?

The greatest difference between summer and winter temperatures is found in the interior. Temperatures in the northern tier of states often drop lower than twenty degrees below zero and frequently to a very cold  $-40^{\circ}$ . The coldest temperature ever recorded in the United States,  $-76^{\circ}$ , occurred at Tanana, Alaska, in 1886. The highest temperature recorded,  $134^{\circ}$ , was experienced at Death Valley, California, in 1913. Such extreme temperatures usually are easier to withstand than might be imagined, because they occur only when there is little moisture in the air. Nevertheless, winters are cold in most of Alaska and the northern-interior states, and summer days are hot over much of the United States except at high altitudes.

As the rainfall map on page 277 shows, rainfall is quite unevenly distributed throughout the United States. The eastern part of the country and the areas near



*Above.* An eight-inch snowfall is cleared from a highway in the Rockies, in Colorado. *Right.* Less than five inches of rain falls each year in Death Valley, California.







*Left.* Most of Hawaii has warm, sunny weather all year. *Above.* A weatherman atop Mt. Washington, New Hampshire, where the average temperature for 20 years was 27° F.



*Left.* View of the New York Stock Exchange, where many stocks are bought and sold each day. *Below.* A stockholders' meeting.



the Pacific Coast in the northwest and in Alaska receive much more rainfall than do the Great Plains and Rocky Mountains. Where rainfall is heaviest, climates tend to be more even and mild. Where less rain falls, extremes in temperature are much more common.

(10) **Abundance of Capital.** Through their energy and the use they have made of their resources, the people in the United States have been able to save large amounts of money. Such accumulated wealth is called **capital**. Much of this capital has been used to start new businesses and to operate and enlarge industries already started. Capital enables manufacturers to buy the raw materials they need and to extend credit to their customers. Vast amounts of capital are necessary to run a large manufacturing business. Millions of dollars often have to be spent on a new factory or product before a single dime is received from sales. Moreover, buyers of large quantities of manufactured articles often have to sell them in their stores in order to get enough money to pay the manufacturers.

Millions of Americans **invest** or put money in companies of various kinds. Such an investment makes them part owners of the companies, and allows them to share in the profits of the companies. People usually invest their savings in **stocks** and **bonds**, investing companies, insurance companies, savings and loan associations, and savings banks. Stocks and bonds may be purchased through companies that sell them. When a person buys stock, he shares in a company's basic worth. The investor takes a risk when he buys stock, because the company may lose money. Of course, the company may also make a great deal of money. The stockholder's share of the company's profits is called a **dividend**.

Bonds, by contrast, are not ownership in a company but are a debt of that company





*Top.* This woman is depositing money in a savings account. Money in savings banks is often loaned to earn interest. *Center.* It is wise to seek professional help before investing in stocks or bonds. *Bottom.* Banks and insurance companies frequently invest large sums of money to help finance housing and apartment developments.



which must be paid regardless of the amount of the company's profits. When a company or the government issues bonds, it promises to pay back the money invested in the bonds plus some interest. Buying bonds is usually a safer investment than buying stocks because the company is obliged to pay. Issuing government bonds is the main way the United States government borrows money when it needs to do so. Do you have any savings bonds?

Investing companies are companies which specialize in investing people's money for them, usually in stocks and bonds. As such companies invest in many stocks and bonds, the investor does not risk as much as he would if he put all his money into one stock. The profits which the investor makes are paid by the company in proportion to the amount invested.

Insurance companies collect money from persons, guaranteeing them a standard return on the money invested unless a person claims more money from the company. If a person dies unexpectedly, for instance, a life insurance company must pay large sums of money in proportion to the money invested by that person. When enough people have a normal life span, however, the difference between the standard amount to be paid to them and what has been earned is profit for the company. Insurance companies invest the money they collect in stocks, bonds, real estate, and similar ventures. This is done so that the money collected, instead of lying idle, can be used to earn more money.

Savings and loan associations and savings banks are much alike. They both encourage people to deposit their savings. Then, the association or bank loans the money to other people or to companies, charging them a rate of interest for the loans. The interest they receive on the money loaned helps them make a profit from the transaction.



(11) **Large Home Market and Foreign Trade.** As you have learned, the United States has a large population – about 195 million people. As a result, the United States has a tremendous demand for goods within its borders. Since American workers receive good wages, they have money to spend for many of the things they want. Advertising companies continue to encourage the people to buy certain products and to develop new wants, too. This large home market has encouraged the growth of manufacturing industries in the United States.

A large foreign market, served by fleets of ships which transport the manufactured articles, also has encouraged the rapid growth of manufacturing industries in the United States. Recently, partly because of much lower wages paid in other lands and partly because of a shortage of dollars elsewhere, demand for products made in the United States has lessened slightly. Nevertheless, the large home market and the sizable foreign market have continued to stimulate progress.

(12) **Universal Education and Research.** Most citizens of the United States believe in universal education, which means education for all. Every child in the country has the opportunity to gain an elementary and a high school education at public expense. Moreover, state colleges and universities provide higher education for interested and able young people at low cost. Many private schools and colleges also provide educational opportunities for children and young people, usually charging a tuition fee. Scholarships are provided for needy students by many such schools. Much of the success and prosperity achieved in the United States has resulted from raising the educational level of the entire population. Much of this success, also, can be attributed to the way science has been used in industry.



*Top.* Millions of dollars are spent each day by shoppers in supermarkets and neighborhood stores throughout the United States. *Center.* Automobile manufacturers produce enough cars and trucks to supply the large home market and markets in foreign lands. *Bottom.* School buses are essential in many school systems that serve a large area.







*Top.* The "slave robot" is a device used for handling radioactive materials. The "arms" and "hands" of this robot are worked by remote controls. *Right.* This chemist is searching for ways to improve a synthetic fiber. *Left.* Research in plant growth helps scientists to find ways to increase the food value of crops and new methods of plant cultivation. *Bottom.* As the Chief of State, President Lyndon B. Johnson performs many duties. Here he is presenting the Medal of Honor for heroism.





Most industries in the United States and many social agencies spend huge amounts of money every year to develop new products and processes. Usually, we are not particularly aware of these chemists, physicists, engineers, and doctors as they work quietly and doggedly in their laboratories. The results of their work are apparent every day, though, in products such as electrical appliances, synthetic fibers, plastics, automobiles, farm machines, airplanes, and new wonder drugs. Even the simplest objects of everyday use, such as the egg beater, are studied in order to improve them and so that they can be produced at less expense.

Careful studies are being made constantly, of the management of factories and business concerns, the flow of traffic, and the use and misuse of natural resources. Scientists are constantly studying soils, seeds, and fertilizers to improve crop yields. At the same time, other scientists are learning more about the nutritional and health needs of the people. The results of such research are used by business, industry, government, and professional persons to provide better living conditions for all.

**(13) A Stable Government.** Progress is difficult if not actually impossible in countries where the government is unstable and disorganized. In order to make rapid progress, people must know that their property is protected and that their government can be trusted. The United States government is one of the strongest, most stable governments in the world. The rights of the people as well as their property have been carefully guarded. Opportunities exist for individuals and groups to compete in developing products and in supporting ideas. The government has interfered only when it was necessary to protect the people against impure products, guard the health and welfare of the people, and prevent unfair practices. As you have learned, changes

in government are made peacefully and harmoniously, so that many governmental policies are maintained in new administrations. Under such conditions, the people and corporations are encouraged to plan ahead and the result is progress.

As you continue studying this unit, you will learn more about the resources, agriculture, and varied industries in the United States. As you do so, try to keep in mind some of the reasons why this nation has become so powerful and prosperous. Each reason, by itself, does not fully explain the greatness of the United States. However, as an explanation, the sum total of these factors are, indeed, a good start!

### QUESTION BOX

34

1. What is the greatest resource of the United States?
2. In what ways is a large area and population an advantage to a country? (Give several reasons.)
3. What limitations are there on the business or industry in which a man may become engaged?
4. How is it possible for less than one-tenth of the people in the United States to raise enough food for everyone?
5. What is a "standardized" product?
6. What is the chief source of power used in manufacturing?
7. Why is a good transportation system essential to the development of an industrial nation?
8. What inland waterway extends almost halfway across the North American continent?
9. What is "capital" and how is much of it used?
10. How can a large home market encourage the growth of manufacturing industries?
11. In what ways can a stable government help a nation to progress?





Iron and steel, the backbone of an industrial nation, are used for many purposes. Without steel, the bridge and the city below could not have been built.

## MANUFACTURING

**The United States Leads in Manufacturing.** The United States is the world's greatest manufacturing nation. It leads every other country in the value of manufactured goods. For many years, especially during the 19th century, Great Britain held first place in manufacturing. Since the end of World War I, manufacturing in the United States has grown rapidly. It is now about six times greater than factory production in Great Britain. The nation with the second greatest production of manufactured goods today is the Soviet Union. The rate of growth of manufacturing industries in the U.S.S.R. is now slightly greater than in the United States, but over-all factory production of manufactured goods is still much greater in the United States.

The United States not only produces but also consumes more manufactured goods than any other nation. About one-fourth of

all the steel and copper smelted in the world is produced and used in the United States. More natural rubber is imported and more synthetic rubber is manufactured than anywhere else. Factories in the United States also produce more agricultural machinery, railway equipment, building material, automobiles, sewing machines, and countless other articles than are produced in any other nation.

The United States as a nation is enormously wealthy. This wealth is visible in buildings and homes, factories, farms and farm equipment, roads and automobiles, railways and airplanes, and everything else owned by the people. No other national population has so much wealth. One reason for such a high standard of living is higher wages and consequently more spending power than is enjoyed in any other country.



**Automation.** You have learned that the extensive use of machines and increased standardization of products have been partly responsible for the rapid growth of manufacturing industries. Many industries in the United States today are developing automatic machines to do work which formerly was done by workers using hand-controlled machines. Many factories have installed large instrument panels which record every step in the manufacturing process. Any failure of a machine at any point in the total process is immediately flashed to the board and appears on the instrument panel. The control operator can, as necessary, either stop all machinery in the factory or stop only those machines affected by the breakdown. He also can start other machines which are used just for emergencies. Then, mechanics can repair the broken machines and the control operator can restart them.

Automation of factories means that fewer workers are needed to produce a product. Some factory workers are concerned that

Many machines are used in offices as well as in industry. The picture below shows a machine used in a bank that transfers information to a punch card.



This process control computer system supervises and directs industrial processes in a steel rolling mill. This machine controls many of the mill's functions.

automation will cause them to lose their jobs. It is true that many jobs now done by workers will be handled completely by machines in the near future. Many of these workers, however, will be needed to make the additional automatic machines. The workers probably will have to learn some new skills, and some of them may have to seek other kinds of work.

Automation of factories is likely to result in products of higher quality. As long as the machines are working properly, every product is identical. Even the most skilled workers, using hand-operated machines, cannot produce articles which are absolutely identical.

**Sources of Power.** As you have learned, the most important sources of power in industry are coal, petroleum, natural gas, water, and atomic energy. You also have learned that the United States possesses



these power sources in abundance. Obtaining these resources and converting them into energy are major industries, providing employment for thousands of people.

**Coal.** There are three kinds of coal: anthracite, or hard coal; bituminous, or soft coal; and lignite, or brown coal. Lignite is softer than bituminous coal and burns with less heat and more smoke. As you have learned, the United States produces about one-fifth of all the coal mined in the world. Major anthracite and bituminous fields are shown on the map on page 255.

Most anthracite is mined in a comparatively small area near Scranton, Pennsylvania. This type of coal burns with very little smoke and therefore is used mainly for heating purposes, particularly in the northeastern part of the United States.

For every ton of anthracite produced in the U.S.A., however, about twenty-three tons of bituminous coal are mined. The best bituminous coal is found in the Appalachian field extending from northern Pennsylvania southwestward into Alabama. Coal from this field furnishes nearly all the fuel for the great iron and steel industries and for many other industries in the eastern states. Other large fields of bituminous coal are located in southern Illinois, western Kentucky, Iowa, Missouri, Kansas, and Oklahoma. Coal from these fields is used for heating purposes and in the many manufacturing industries of the central states. Numerous smaller bituminous coal fields are found in the Great Plains region, among the Rocky Mountains, and in western portions of the state of Washington.

Huge deposits of lignite have been located in North Dakota, Wyoming, and Montana. Recently a huge power plant was started near a lignite deposit in North Dakota. The plant will burn the lignite and produce electricity, which will provide power for industries. Other uses for lignite are being developed, too.

Bituminous coal is used chiefly in manufacturing, both as a power source and as a source of other needed materials. Bituminous coal burns with a longer flame and ordinarily gives off more heat than does anthracite. Unless thoroughly cleaned and burned in a special kind of burner, however, it generally gives off dense black smoke. For this reason, it is not as desirable as anthracite for heating homes.

Bituminous coal is the source of many valuable products. Certain processes of treating the coal result in coke, coal gas, and many chemicals which in turn are used in industries. Thousands of products made from coal are now in daily use, including perfumes, fingernail polishes, nylons, dyes, paints, and plastics. Unfortunately much coal is still burned in its raw state so that the greater part of the gas and other by-products are lost. Better methods of preparing and burning coal, so as to obtain more heat and power from its use, are constantly being perfected. Much energy from coal now is converted into gas and electricity, both of which can be more cheaply transported and more easily used than coal. Gas and electric utility companies now are among the largest purchasers of coal.

In mining coal, machines now do much of the work that formerly was done by miners with picks, shovels, drills, and small coal cars. In some mines today, a machine saws an opening under a mass of coal, and an electric drill is used to pierce holes for the explosives. After the coal is dislodged, a loading machine picks up the coal and loads it into a shuttle car. This small car carries the coal to a continuous conveyor belt or an underground railway which carries the coal to the surface. In other mines, continuous mining machines are used to do all the work. Sharp, steel teeth tear the coal from the seam. The coal falls on a conveyor belt which carries it to coal cars or the longer conveyor belt.





*Above left.* Coal is removed from this open pit mine in Illinois by a 21,160 ton excavator. *Left.* This continuous mining machine can dig 8 tons per minute. *Above.* A high-speed conveyor belt is taking coal from an underground mine to the surface.



*Right.* Safety meetings are an important part of on-the-job training in most mines. Coal mining in the United States is now twice as safe as it was forty years ago. *Below.* Complex plants such as this convert coal into many valuable products. *Lower right.* These laboratory workers employed by a coal company are seeking ways to make use of the waste materials of the coal-mining process.





**Petroleum and Natural Gas.** Many of the most useful fuels used by individuals as well as by industries are made from petroleum. Gasoline, kerosene, fuel oils, and diesel oil are among these petroleum products. Fuel oils supply power for factories, smelters, and power plants. **Lubricants**, which are oils and greases made from petroleum, are used to keep the movable parts of engines and machines running smoothly. If these movable parts were not given a protective covering by the lubricants, friction and heat would soon destroy them.

Natural gas is a clean and convenient fuel to use both in manufacturing industries and in homes. Because of its cleanliness and the high temperatures at which it burns, natural gas is used in making glass, pottery, and cement. Large quantities also are used in the iron and steel industries. Later in this book, you will learn more about the giant petroleum industry and about natural gas.

**Water Power and Electricity.** Unlike coal, petroleum, and natural gas, water power is a lasting source of energy for it is constantly being replaced by rainfall. Coal, petroleum, and natural gas, once removed from the ground and used, can never be replaced. Many years ago, when men first began to build factories, water power was the only kind of power that could be used. You will remember that small mills were built on the streams, and the force of the flowing water was used to turn a wheel in the stream. The wheel, in turn, provided power for the machinery. Then steam power made from coal began to take the place of water power. Water power had one disadvantage as compared with steam power — the factories had to be located near a river. Steam power, on the other hand, could be made anywhere so that the industry could be located wherever it was most convenient. Soon, however, it was discovered that water power could be

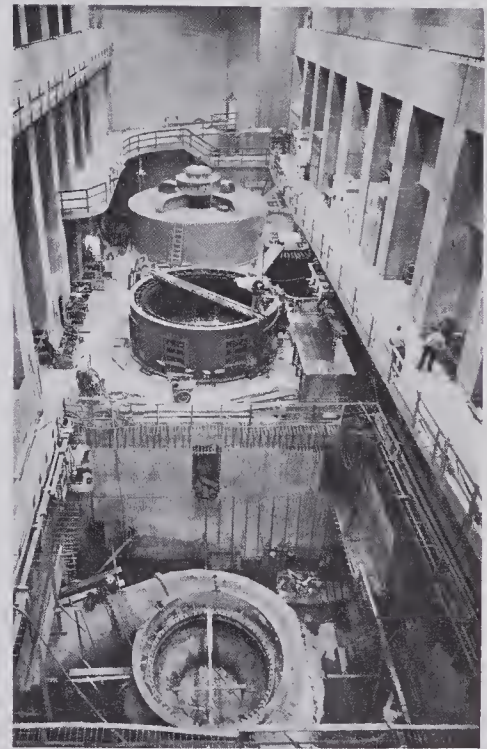
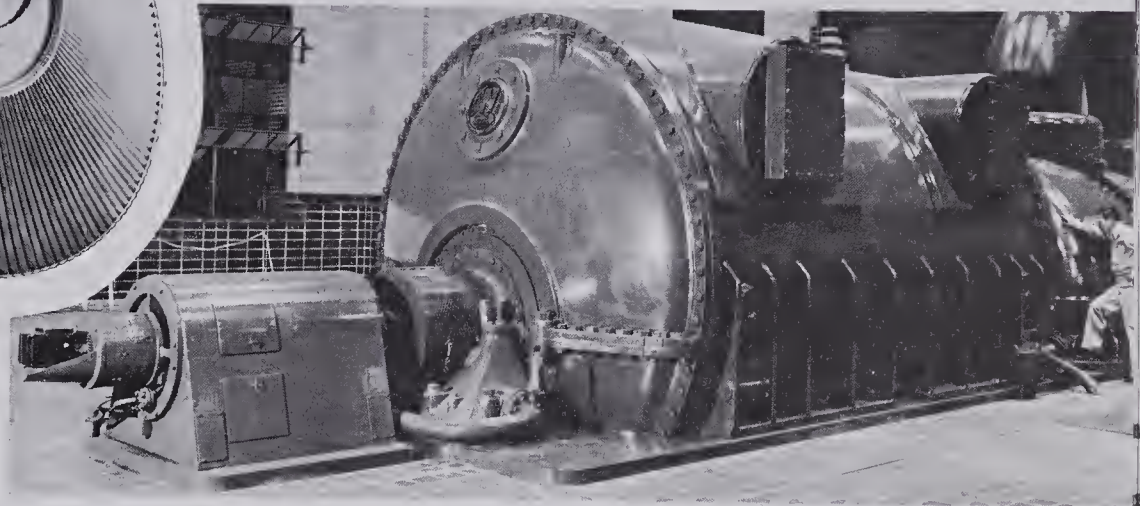
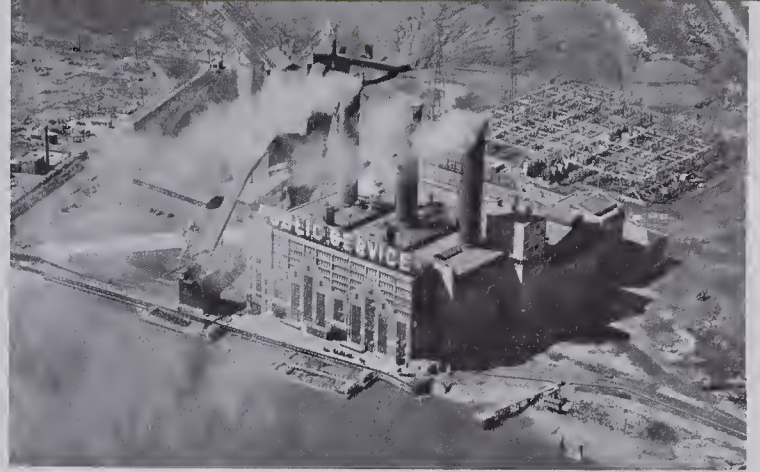
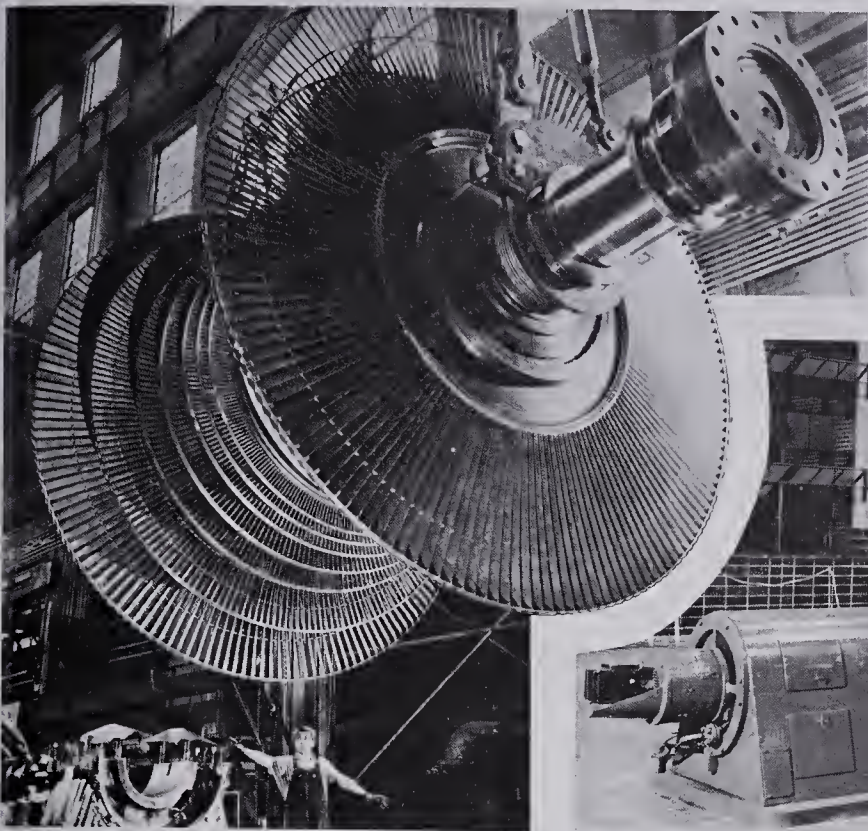
used to make electric power. Nevertheless, most of the electricity used in the United States still is generated by using coal, petroleum, or natural gas as a fuel.

Electricity lights our homes, runs many of our street cars and buses, and drives many railroad trains. It carries voices over the telephone, messages over the telegraph, and both voices and messages through the air by radio waves. It transmits the image as well as the voice over the air waves in television. It turns the wheels in many of our factories, and furnishes the power for many of the labor-saving devices in our homes and shops. New ways of using electricity are constantly being invented.

In several sections of the United States, a super-power system has been developed. Such a system links together power stations, run by either coal or water power, into one great transmission unit. A hydroelectric plant, for example, may fail to produce enough power for its surrounding area because of a drought. Additional electric current then could be switched on from some other power station, very likely one using coal as a generating fuel. There are certain hours in the day when a great deal of electric current is used in the cities. The time when this "peak load" occurs, however, varies from place to place. If all cities in the United States were connected in one huge super-power system, power could be switched from one city to another as needed.

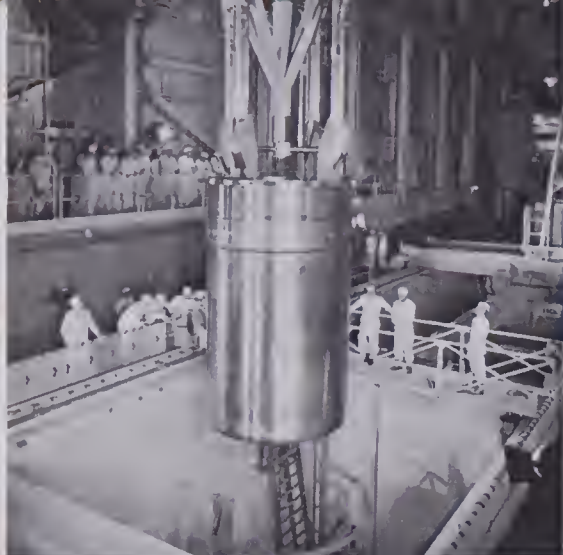
**Atomic Energy.** As you have learned, atomic energy is the newest and most powerful form of energy, and may someday replace the other power sources. Atomic power gets its name from the **atom**. An atom is one of the smallest pieces of matter that make up any substance. One hundred million copper atoms put side by side would be about an inch long. Different kinds of electrical particles including **protons**, **neutrons**, and **electrons** make up an





The three pictures above show a steam-generated electrical plant powered by coal. Most electricity used by cities and towns is produced in plants such as this. *Top left.* View of a steam turbine. Steam under pressure is driven against the narrow blades of this turbine. As it turns, it supplies mechanical power to the generator which, in turn, produces electrical power. Turbines such as this are placed inside the generator shown on the right. *Center left.* View of the kind of a turbine used in hydroelectric plants. As water falls against the curved blades, the wheel turns and powers a generator. *Center right.* Such water turbines are placed inside the assemblies shown on the right. *Bottom.* Night view of a factory. How many uses for electricity can you find in your community?





At left, a nuclear core, or charge, is lowered into position in the nation's first full-scale, atomic-powered electrical plant, shown on the right.

atom. Learn what you can about each of these from science books and encyclopedias.

Atomic power is the power released by the breaking apart of atoms. This process of splitting the atom is called **atomic fission**. Fission is a difficult process to start because the protons and neutrons are held firmly together by an invisible, but powerful, energy force. When fission occurs, this energy is released. Uncontrolled fission results in a mammoth explosion. Controlled fission can be used to produce electricity. Power plants run by atomic energy are now in operation in several places in the U.S.A.

**Geothermal Power.** Another source of power which soon may be of some importance is steam wells. In the Imperial Valley in California, such wells have been drilled. The steam will be used to produce electricity. It comes from the ground hot enough so that no additional fuel need be used. Other steam wells have been drilled in northern California.

**Types of Manufacturing.** No one factory tries to make everything needed in a community. Factories which produce related goods are grouped together into **industries**. An industry is a branch of manufacturing or commerce which produces a particular product or performs a particular service. Among the great manufacturing industries in the U.S.A. are those making iron and steel, other metals,

automobiles, petroleum products, rubber products, airplanes and rockets, electronics and electrical goods, and chemicals. Other industries produce goods related to agricultural products, such as the food-processing, meat-packing, textiles from natural fibers, clothing, and leather-goods industries. Workers in other industries cut lumber and make furniture and other goods from wood, gather seafood from the oceans, and transport people and goods. Such major industries will be discussed briefly in the next several pages of this book. You will want to read much more about them in encyclopedias and other reference books.

### QUESTION BOX

35

1. What nations produce more manufactured goods than the United States?
2. What are the advantages of automation in manufacturing industries?
3. What problems may be caused by increased automation in the years just ahead?
4. Why is bituminous coal rather than anthracite used in manufacturing industries?
5. What fuels are used in producing the most of the electricity generated in the United States?



## THE IRON AND STEEL INDUSTRY

**Importance of Iron and Steel.** Have you ever noticed how many objects you use each day are made of steel? It is hard to imagine what life in the United States would be like without steel. Some objects usually made of steel can be made of other metals, but often they would be more expensive and of lower quality. A tin can, for instance, would be much more expensive if it were made entirely of tin. A knife could be made of copper, but it would not last very long nor would it retain a sharp cutting edge. Because steel is such a useful metal, the iron and steel industry is one of the most important in the United States.

**Iron Ore Resources.** The United States has large deposits of iron ore, but factories have been using this resource at a very rapid rate. You will remember that there is little manufacturing in a number of Latin American countries, partly because they lack iron ore. Some Latin American countries with a great deal of ore have not developed significant manufacturing industries, however. Availability of iron ore cannot altogether explain the rapid development of industry in the United States, but undoubtedly it has been a major contributing factor.

The amount of iron ore mined in the United States varies greatly from year to year, but the average annual production is about 75 million tons. Most of the ore comes from the Mesabi Range in Minnesota. Large amounts also are mined in Michigan and Wisconsin. Smaller amounts are mined near Birmingham, Alabama, and in several other areas, as shown on the map on page 255.

There are several ways of mining iron ore; the method used depends upon the type of deposit and its depth under the Earth's surface. In the Mesabi Range the ore is found fairly close to the surface of



An iron ore mine in Minnesota's Mesabi Range. What type of mining is done here?

the Earth. Thus, open pit mining methods, in which huge shovels scoop out several tons of ore at a time, are used. At a mine in upper Michigan, by contrast, ore has been found about 1,200 feet below the surface. Such ore deposits are harder to work because the ore has to be carefully blasted or cut from the walls of tunnels in the mine. Do you remember what this kind of mine is called?

**Iron from Iron Ore.** Ore is rock or earth which contains large amounts of some metal. There is no place on Earth where pure iron ore is found. Iron is always mixed with various other materials which must be separated from the iron before it can be used. As you know, the iron is separated by a process called smelting.

A power conveyor loads iron ore into a ship in Venezuela. The ore will be shipped to Atlantic Coast steel mills in the United States.







*Top left.* Red-hot coke is "pushed" from an oven into a quencher car where 5,000 gallons of water cool the coke. *Above.* Iron ore is made into pig iron in the tall blast furnaces. Cast iron is made in the silo-like structures between the furnaces. *Far left.* Melted scrap iron is "charged" with molten pig iron in an open-hearth furnace. The steel will "cook" in the furnace from eight to ten hours. *Left.* The furnace is then "tapped" and the steel flows into a ladle. Overflowing the ladle is the slag, which is lighter in weight than the steel.

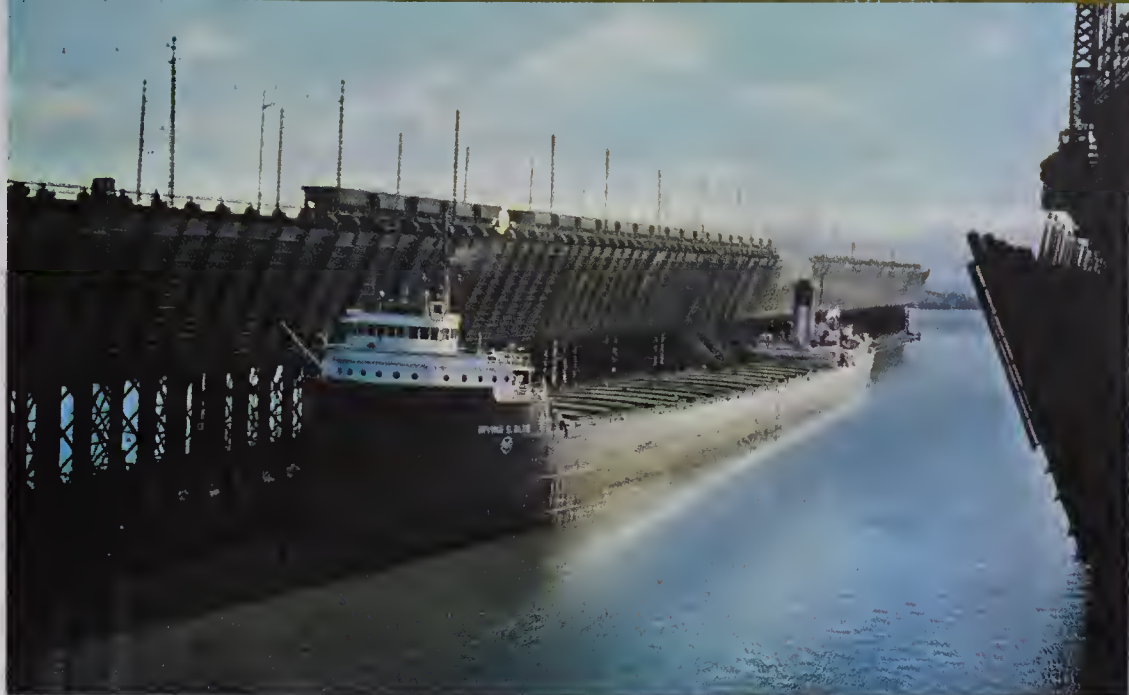


*Right.* Steel flows into ingot molds. *Below.* As the steel solidifies, the ingots are lowered into ovens called "soaking pits." *Bottom right.* A red-hot steel slab may be squeezed into a strip of steel a quarter of a mile long in this machine.





This Great Lakes freighter is taking on a load of iron ore. Note the chutes that come down like mechanical "arms" and direct the ore into the holds of the ship.



To obtain iron, the iron ore is placed in a huge furnace with coke and limestone, which help separate the iron from the other materials in the ore. Extremely hot air is blasted or forced into the furnace, making the coke burn. The heat from the hot air and burning coke causes some of the materials in the ore to burn up and other ingredients to melt. The iron melts also, but because it is heavier than the other materials, it goes to the bottom of the furnace and is drained off. The iron which comes from such a blast furnace is called **pig iron**. It is seldom used commercially, but is used in making cast iron and wrought iron. Fire hydrants, automobile engine blocks, smokestacks, pipes, and many other products are made of iron. The principal use of pig iron, though, is in the steel-making process.

The main difference between iron and steel is in the amount of carbon which each contains. Iron has much carbon in it; steel has little carbon. The more carbon there is in iron or steel, the more brittle the material is.

**Steel from Iron.** A method of making steel from iron had been known for centuries, but the process took several weeks. Because of this, steel was made only in very small quantities and was very expensive. When railroad building began, about the middle of the past century, the demand for steel was greatly increased. Inexpen-

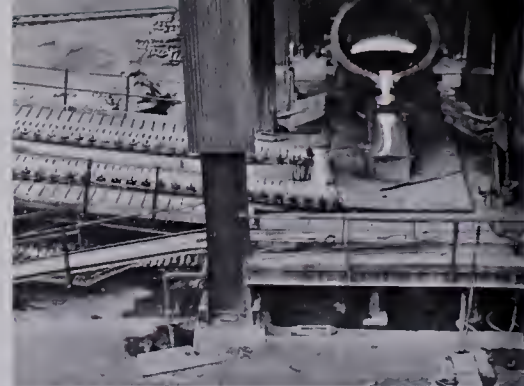
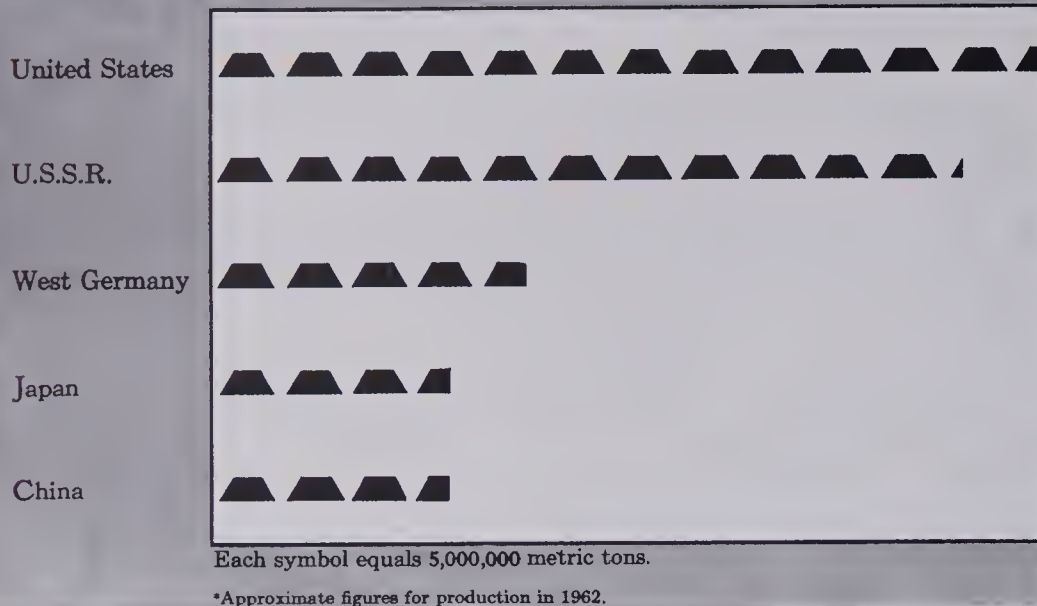
sive steel and large amounts of it were badly needed. Attempts to use iron for the rails had been unsuccessful because the brittle rails often snapped as the trains ran over them. Steel, with its low carbon content, had the strength and lasting qualities desired.

In 1856, an Englishman named Bessemer discovered a process by which steel could be made in thirty minutes. Blasts of cold air were forced through white hot, liquid pig iron called molten pig iron. This process reduced much of the carbon content. Although much stronger than iron, steel made in this way still was not strong enough to withstand the weight of railroad trains.

Then the open-hearth method of making steel was developed. This method takes about ten hours. First, limestone and scrap steel are heated by hot air and gas in a furnace. The molten limestone floats to the top of the furnace and absorbs the impurities in the mixture. Molten pig iron then is added to the mixture, and the materials begin to form a mass of steel. Several tests are then made to determine the carbon content. Often other metals such as magnesium, tungsten, nickel, chromium, and vanadium may be added to make steel **alloys** which are very hard and strong. An alloy is a metal made by combining two or more other metals. When the smelting process



## FIVE LEADING PRODUCERS OF PIG IRON AND IRON ALLOYS\*



Molten pig iron is poured into molds to solidify. The bars are then cooled in water. It is easy to transport and store the bars of pig iron. What countries are major producers of pig iron?

is complete, the molten steel is tapped from the furnace and the slag or waste material is drawn off. This process gets rid of larger amounts of carbon and other impurities than the Bessemer process. Because of the longer time required to make it, such steel is more expensive, but it is the best material to use when strength is needed.

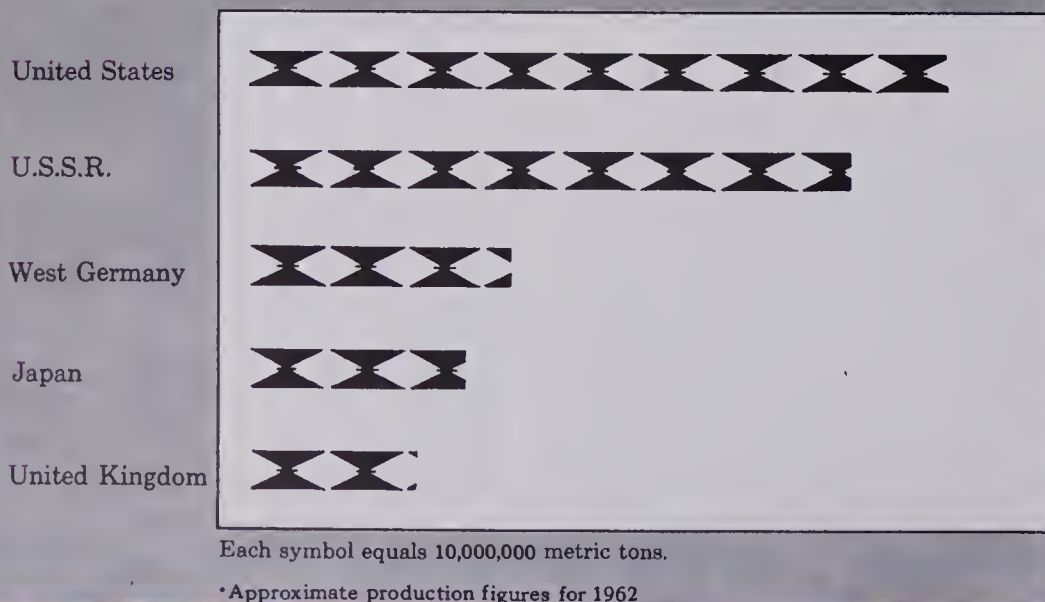
Most steel is still smelted in open-hearth furnaces. A new furnace, called a basic oxygen converter, has recently been developed. It produces as much steel in 50 minutes as an open-hearth furnace does in 10 hours. Some steels of very high quality are made in electric furnaces.

**Growth of the Steel Industry.** Although iron and steel now are made in several parts of the United States, the industry was started in western Pennsylvania. There, the needed raw materials were found.

Coke is a better fuel than coal to use in smelting iron. Bituminous coal from which good coke could be made was abundant near Pittsburgh. Since iron ore also was found nearby, Pittsburgh naturally became a center for the iron and steel industry. Similarly, Birmingham, Alabama, became an iron and steel center because it was located near deposits of iron ore, coking coal, and limestone.

After the discovery of high-quality iron-ore deposits in the Mesabi Range, steel-making centers grew along the shores of the Great Lakes. The ore and needed coal could be transported to these centers cheaply. Gary, Indiana, in time became the greatest steel-producing center in the United States. Now that iron ore is imported from a number of countries, including Canada and Venezuela, other large

## FIVE LEADING PRODUCERS OF CRUDE STEEL\*



An electromagnet empties steel scrap into a bin. Much scrap is used in making steel. Compare the graphs on this page. Do the leading pig-iron producers also lead in output of crude steel?





steel-making centers have developed. Some of these, such as Morrisville, Pennsylvania, are located on navigable rivers near the Atlantic Coast. Others, such as Los Angeles, California, are located on or near a seaport. Most steel-making centers are located near good coal fields, however, because it costs more to transport huge amounts of coal than it costs to transport the ore. They have also developed near large markets, because it is more expensive to transport the finished steel products than it is to transport the necessary raw materials.

**Uses of Iron and Steel and Location of Plants.** Almost all other manufacturing industries today depend partly upon the iron and steel industry. About one-fifth of the steel produced in the United States each year is used by the automobile industry. Large quantities of steel are used in constructing buildings, bridges, and railroads. Steel is used in making ships, farm machinery, "tin" cans, and electrical appliances. Most tools, toys, scissors, needles, bobby pins, nails, and other small items are made partly of steel.

Iron and steel are heavy and some manufactured iron and steel products are bulky. For these reasons, many industries which make steel products have been built near steel-producing centers. Such measures lower transportation costs. However, if a product is sold largely in one section of the nation, it is usually manufactured in that section. For example, automobiles which are sold all over the country are manufactured mainly in Michigan near iron and steel centers. Most of the machines used in the textile industries of New England and the South are made in these two sections of the country, however. The farm machinery industries are located mainly in the great central agricultural region of the United States and near iron and steel centers.



Good transportation facilities have helped to make Gary, Indiana, a major steel center.

### QUESTION BOX

36

1. From what state does most of the iron ore mined in the United States come?
2. What is the main difference between iron and steel?
3. What is an alloy?
4. What are the advantages of steel as contrasted with iron?
5. What are the major steel-producing centers of the United States? Why did they develop where they did?
6. Why have some steel-producing centers developed in recent years near the Atlantic and Pacific Coasts?
7. What are some of the main uses for iron and steel?

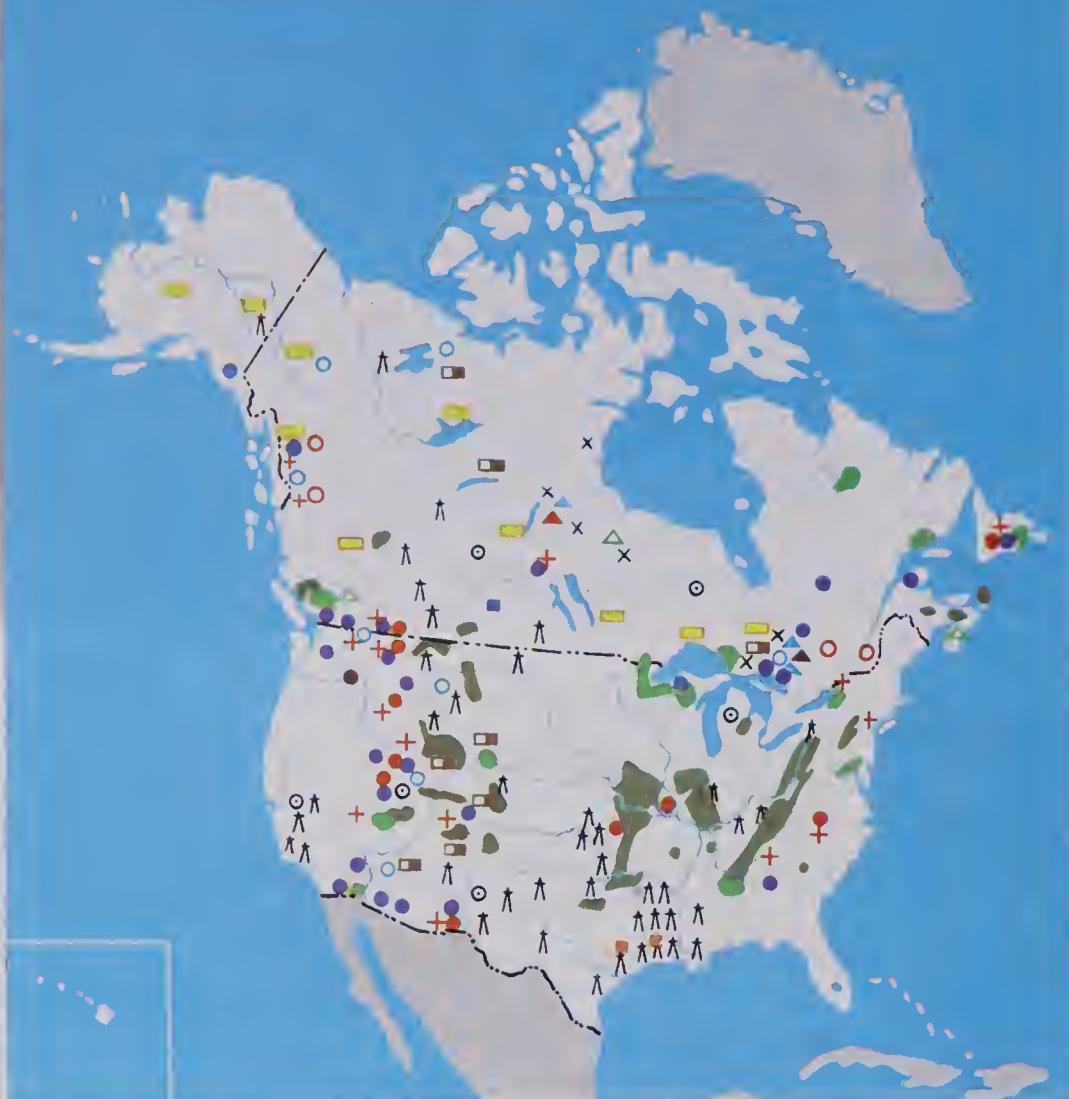
This huge 75-ton steel cylinder will be used in a press which will make airplane parts.





## MINERAL RESOURCES OF UNITED STATES AND CANADA

Iron	Sulfur
Coal	Silver
Petroleum	Salt
Copper	Platinum
Lead	Cobalt
Gold	Gypsum
Uranium	Nickel
Zinc	Asbestos
Bauxite	Potash



This map shows the location of major mineral resources in the United States and Canada.

## OTHER METALS AND THEIR PRODUCTS

Each year, mills in the United States produce more iron and steel than any other metal. Nevertheless, many people are engaged in smelting or making products from other metals. Metals which are used extensively in making a wide variety of products are aluminum, copper, zinc, lead, and uranium. Silver, gold, and platinum are used in jewelry. Because platinum can withstand high temperatures, it is used for certain processes in industry.

**Aluminum.** In the United States, a great deal of aluminum is used each year and production of this silver-white metal has been increasing tremendously. The United States now produces about one-half of the world's supply of aluminum. Aluminum is a very useful metal because it is light in

weight and does not rust easily. Even though aluminum weighs only about one-third as much as steel, it can be made quite strong. The wings of airplanes, for instance, are made of aluminum, and so also are the outside walls of many skyscrapers. You probably use aluminum in some form almost every day. Much of it is used to make aluminum foil. Many mothers use aluminum foil to wrap sandwiches for lunch or food which is kept in the refrigerator. Most toothpaste is packaged in aluminum tubes. A great many storm doors and windows are made of aluminum. In addition, aluminum is used in electrical wires and cables, parts of automobiles and trucks, and many home appliances. Most homes in the United States, for instance, probably have some aluminum pans, ice trays, and an electric iron. Most of them are made wholly or partly of this very useful light metal.





This Indiana mill can process 40,000 pounds of aluminum an hour. In minutes, it reduces a 12-inch-thick ingot to thin sheets.

As you know, aluminum is made from bauxite. About four pounds of bauxite are needed to make one pound of aluminum. Most of the aluminum produced in the United States is made from imported bauxite. Do you remember the important sources of this mineral in Latin America? Since a large amount of electricity is required to produce aluminum, plants are usually located near the coast where electricity is inexpensive. More aluminum is made in the state of Washington than in any other state. The bauxite is transported by ocean steamers, and the electricity is produced by hydroelectric plants on the Columbia River. Other states leading in aluminum production are Texas, Louisiana,

Copper ore is hauled beneath Butte, Montana, once called "the richest hill on earth." There are 2,551 miles of tunnels under Butte.

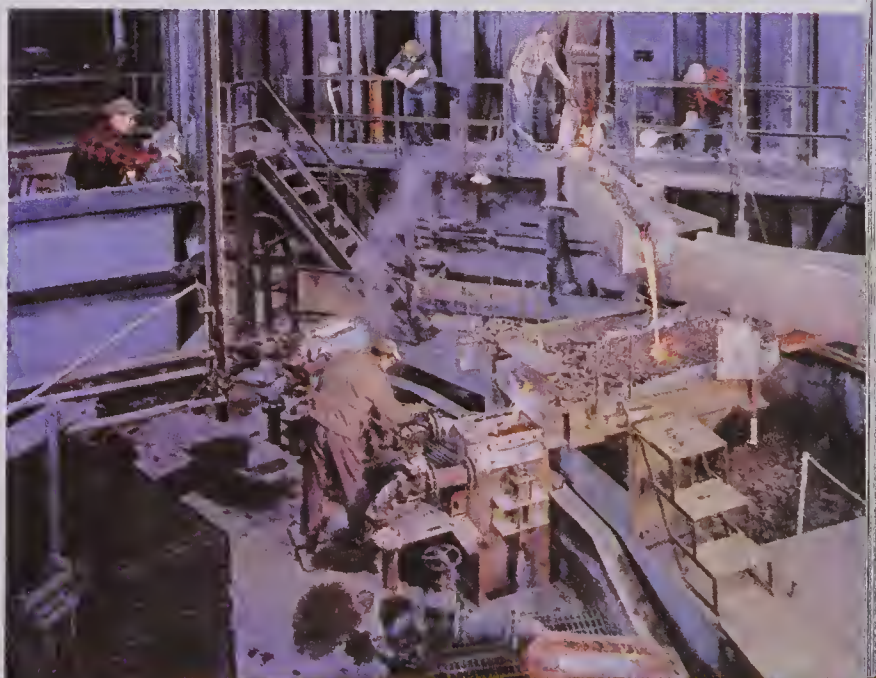


Brass and copper bars, just arriving from a rolling mill, are shown having their surface imperfections removed.

Indiana, Ohio, West Virginia, Arkansas, and Tennessee. Arkansas is the only state in which deposits of bauxite are mined. Several aluminum plants have been built along the Ohio and Tennessee Rivers because of their nearness to major markets and because barges can carry bauxite upstream from New Orleans. Cheap power in the Tennessee Valley and coal fields near the Ohio River have also influenced the placement of these plants.

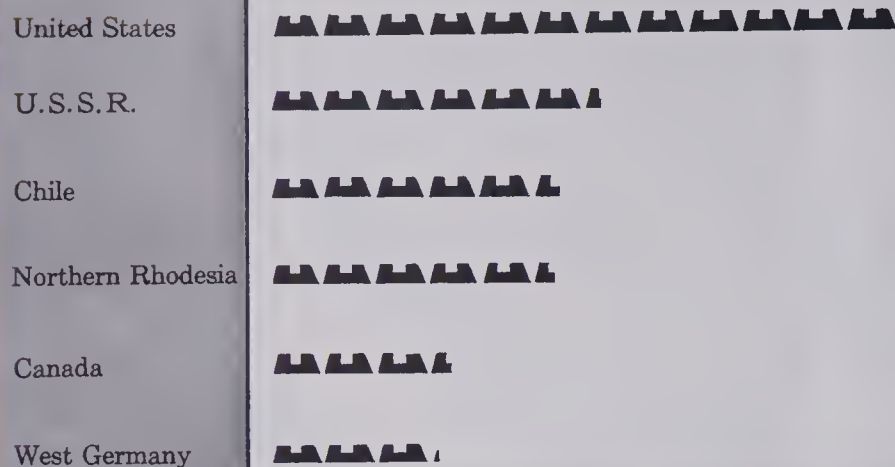
**Copper.** A reddish-brown metal called copper has been used for thousands of years. Today about one-fourth of the world's copper is produced in the United States, mostly from ores mined within the country. Copper ores are also imported.

This casting wheel at a New Jersey copper mill has 24 water-cooled molds. Each mold holds a copper "cake" weighing 3,000 pounds.





## FIVE LEADING COPPER-PRODUCING COUNTRIES\*



Each symbol equals 100,000 metric tons.

\*Approximate figures for production in 1962.

This graph shows that the United States leads the world in the production of smelted copper. Large quantities of copper are imported by the United States.

Arizona leads all the states in mining copper ore; in fact, about half of the copper ore mined in the United States comes from Arizona. Other leading states in mining copper ore are Utah, Montana, Nevada, Michigan, and New Mexico. Copper ores are mined by open pit and shaft methods. At smelters, the copper ore is ground to a fine dust and the copper then is separated from other minerals in the ore by a flotation process. In this process, the ore particles are floated in a tank containing oil and water. The copper-bearing particles float on top of the oil, while the waste sinks to the bottom of the tank. The concentrated ore is then smelted to remove additional impurities and is further purified by a process using electricity.

Copper, which is heavier and softer than iron, is a very good conductor of electricity and therefore is used in electric motors and telephone wires. At one time, most wires carrying electricity long distances were made of copper. Now, many of these wires are made of aluminum because it weighs so much less than copper.

In addition to its purpose as a conductor of electricity, for which about half of the total annual production is used, copper has other uses. Copper compounds, for instance, are used in many poisons and insecticides. Many coins have copper in them. Combined with zinc, copper forms

a metal called brass—an alloy which resists rust. Many doorknobs and stair rails in public buildings are made of brass. Combined with tin, copper forms another alloy known as bronze, which frequently is used to make bells and statues.

**Zinc.** Zinc is a soft metal principally used for coating sheet iron and steel. This coating process is known as **galvanizing**, and is done to help prevent rusting. Perhaps you have some galvanized iron pails or cans in your home. Galvanized steel is used in making garbage cans, and is also used in gutters and downspouts. As you have learned, zinc is combined with copper to form brass.

About half of the United States' production of zinc depends upon ores imported from Canada, Mexico, and Peru. Leading states in zinc production include Tennessee, Idaho, New York, Arizona, Utah, and Colorado. In the smelting process, zinc is heated with coal. The zinc rises from the mixture in the form of vapor. It soon condenses to a liquid and is poured into molds to cool and harden.

**Lead.** The United States is one of the world's major producers of lead. Other important producers are Australia, the U.S.S.R., Mexico, Canada, and Peru. The combined output of Missouri, Idaho, and Utah is equal to about four-fifths of the lead mined in the United States.





*Left.* Molten lead is being used to solder a pipe joint. *Right.* Tubs are shown being galvanized or coated with zinc to make them rust-resistant. *Below.* This zinc and lead mine in Colorado is 9,000 feet above sea level.

Ore in which lead is found also contains many other minerals including gold, silver, copper, zinc, and sulfur. The crude lead produced in the smelting process contains many impurities, and further refining is necessary to obtain pure lead. Lead is a very soft metal which is alloyed with tin to make solder. It is also alloyed with antimony to make bullets and the type used in printing. Much lead is used in making paints and high octane gasoline. The largest quantities of lead are used in storage batteries and coverings for electric cables.



Uranium prospectors use new techniques in searching for deposits. These men are trying to locate a deposit with an instrument which measures radioactivity.

The rocks which this miner is preparing to bring to the surface contain silver, lead, and zinc ores. Traces of uranium and other metals may also be present.





**Uranium.** Today, uranium is one of the world's most precious metals because it is a source of atomic energy. Vast amounts of energy can be obtained from uranium. One pound of uranium produces about as much energy as 1,300 tons of coal or 6,000 barrels of oil. Known deposits of uranium could produce from 17 to 42 times more power than the vast known deposits of coal and petroleum.

The United States probably leads the world in production of uranium, although the amount produced in the Soviet Union is not known. Other principal producers of this important mineral are Canada, South Africa, and the Congo. Important deposits of uranium also are found in Australia, India, and Portugal. More than two-thirds of the known deposits of uranium in the United States are located in New Mexico. Utah, Wyoming, Colorado, and Arizona also have important deposits, most of them in the Colorado Plateau area where the four states meet. Uranium ores in the United States contain much less uranium per ton of ore than the ores mined in the Congo and Canada. Hence, plants which process the ore are usually built at the mine site.

At present, electricity is being produced in several countries by plants operating from atomic energy, and submarines and ships also are powered by atomic energy. Uranium may soon become an important source of industrial power because the cost of producing nuclear power has dropped rapidly in recent years. At least in some places, it costs only slightly more than the cost of power produced by coal or petroleum. Dangerous radioactive waste materials are created in atomic power plants, and ways of using or disposing of these waste materials safely and wisely must be found. Research continues in the production and use of atomic energy, but most big problems have been solved.

## THE AUTOMOBILE INDUSTRY

### **The Growth of the Automobile Industry.**

The growth of the automobile industry in the United States has been very rapid. Only about 300 automobiles were made in 1898, and only about 4,000 were made in 1900. Not until 1910 were automobiles produced in large numbers; 181,000 were made that year. About 4,000,000 were made in 1940, and the yearly production now is about 7,000,000 cars. The country's largest manufacturing company produces automobiles, mainly. Three of the ten largest manufacturing companies produce automobiles, and three others are petroleum companies which supply the needed fuels for automobiles and trucks. Moreover, two other of the ten largest firms are steel companies which provide the raw materials for the bodies and many of the needed parts of automobiles.

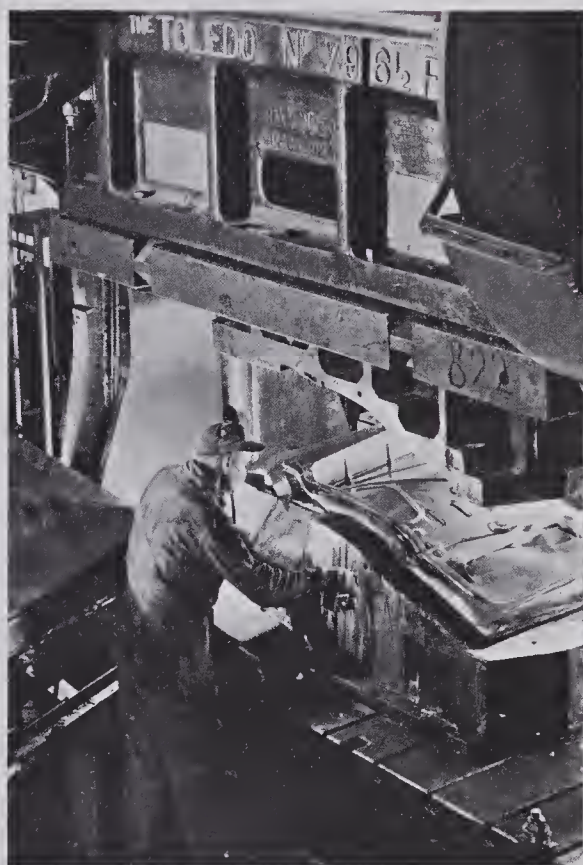
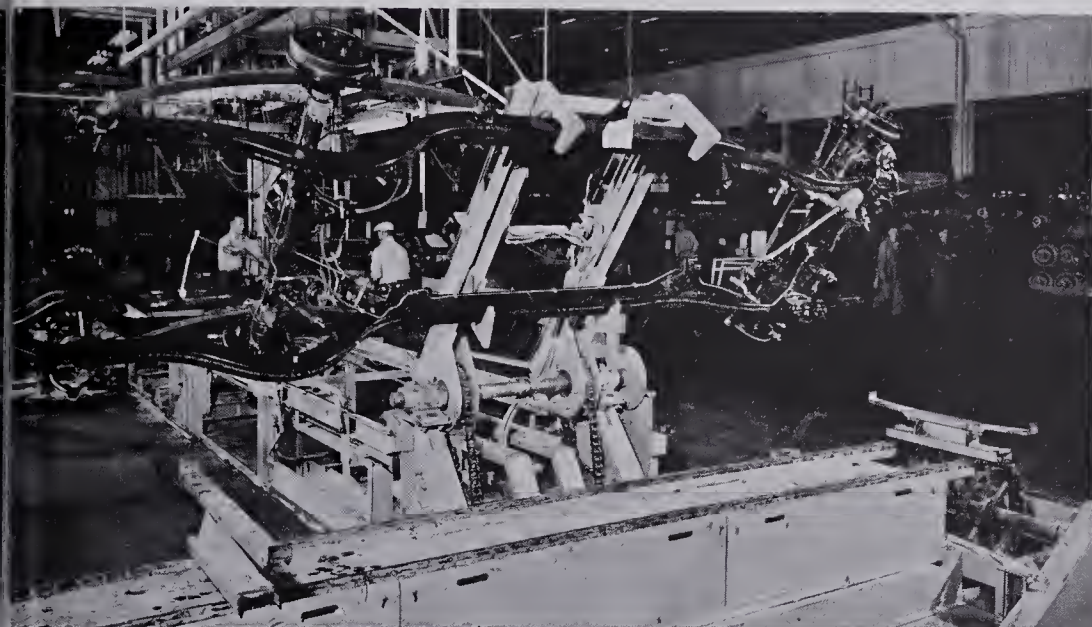
Although the number of trucks made annually in the United States is considerably less than the number of automobiles, the rate of growth in their production has been about the same. About 6,000 trucks were made in 1910; now about 1,250,000 trucks are made each year.

Fairly adequate petroleum resources and possession of most of the raw materials needed for automobile production have aided this growth. Better roads and higher wages have caused great demand for cars. However, a main reason for the enormous productivity of automobile manufacturing plants is the use of the assembly line.

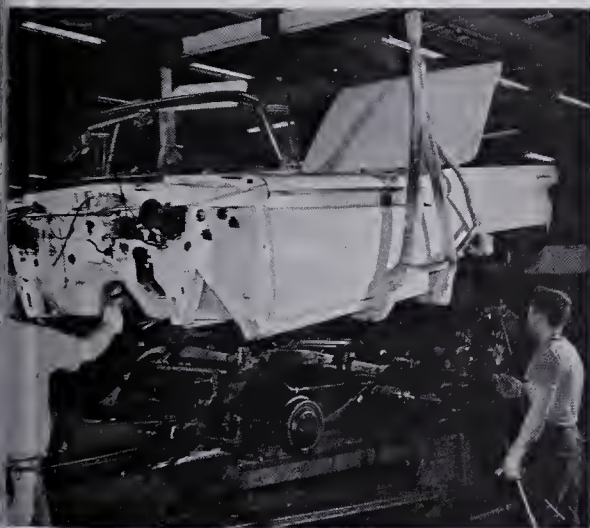
**The Assembly Line.** An assembly line is a grouping of machines and workers. These are organized in such a way that the parts of a product are assembled, or put together, in one continuous process. Assembly-line methods in industry first were widely used on a large scale in automobile-manufacturing plants. On the main assembly line at an automobile plant, the



*Right.* A scale model of an automobile factory helps in planning production methods. *Below.* The front and rear axles are attached to the frame of a car while it is upside down. *Lower right.* The inside panel of a door is shown being stamped in a heavy press.



*Left.* A convertible body is lowered and placed on its frame. *Below.* Freshly painted cars move along an assembly line. *Lower left.* These cars are given various inspections before they leave the factory for shipment.







During the "horse and buggy" days, travel over dirt roads was usually slow — especially during the spring, when roads were muddy.

bare frame of the car is placed on a conveyor belt. The frame is moved along slowly through a line of workers who assemble the car piece by piece. Other smaller assembly lines assemble parts which are then added to the car on the main line. The wheels, body, engine, and other parts are added until the car is complete. At the end of the main assembly line, gasoline, oil, and water are put into the car and it is driven away to a large parking lot. Some automobile plants can assemble 3,000 cars a day using such methods.

**Centers of Automobile Production.** The largest automobile manufacturing plants are located in Michigan, although many assembly plants have been built elsewhere. Detroit is the largest automobile center; Pontiac, Flint, and Lansing also are important.

One of the reasons why the industry developed in Michigan was its closeness to large iron and steel centers. Land and water transportation also were available. Before the time of the automobile, Michigan had become a center for making horse-drawn carriages. Another reason for the development of the industry in Michigan was that many of the industry's pioneers lived there. Among them were Henry Ford, Durant, and Olds.

**Effect on Other Industries.** The automobile industry has had a tremendous influence on other industries. Millions of tons of iron and steel, millions of square feet of glass, and millions of yards of upholstery materials are used annually in making automobiles and trucks. Thousands of miles of wire, millions of pounds of copper, lead, and aluminum, and thousands of tons of rubber also are needed. These materials must be supplied by other industries. Because of such great demands, related industries have grown very rapidly. In the United States, one person out of every seven has a job which is in some way connected with the automobile industry.

**The Country and City before the Automobile.** Until the early part of this century, sizable communities in the United States grew only where there was a convenient method of transportation. People lived mostly along the seacoast and near lakes, rivers, canals, and railroads. Large areas of the nation had few people because the only way of reaching them was by horse and wagon. Fertile land was not cultivated because the crops could not be transported rapidly to a city or a railroad. People living in rural areas often were isolated for many weeks at a time. People in

Most farmers today drive over roads that are passable year-round. In his jeep, though, this farmer can drive almost anywhere on his farm.





small, rural villages seldom saw anyone from outside their villages. A trip of 20 miles by horse and buggy was a long, hard one. The poor roads often could not be traveled at all because of mud or snow.

Cities were crowded because everyone had to live close to his place of business. People living in a city rarely left it. City streets, although usually hard-surfaced, were very rough.

**The Country and City after the Automobile.** The automobile, perhaps more than any other single invention, has had a tremendous effect on ways of living in the United States. No longer are people bound to areas along the seacoast, rivers, and railroads. Large areas of farmland which are far from rivers and railroads can now be cultivated. Farmers carry their produce to market in trucks. Since roads have been built to almost every section of the country, people can now move easily from one city to another. Moreover, people in rural areas now go to town much more often. Children in rural areas often ride to school in buses. A trip to town, which took an entire day by horse and buggy has been shortened to a twenty-minute trip by car on well-paved roads.

As automobiles became more widely used, people who lived in large cities began to move to the outskirts of the city and to the country. Suburban areas developed with many homes, shopping centers, and often sizable industries. City streets built for the horse and wagon had to be widened to accommodate large numbers of automobiles. Parking lots and garages were built. Systems of controlling traffic were planned, and toll roads and freeways were constructed. Today, more than 75 million cars and trucks are in use in the United States. About 55 million cars and trucks are in use in all the other countries of the world. The United States is, without doubt, a nation on wheels.

## THE PETROLEUM INDUSTRY

You have learned that petroleum is one of the most valuable mineral resources of the United States. Four main products obtained in the refining of crude oil or petroleum are fuel oil, gasoline, kerosene, and lubricating oil. Other products, such as naphtha, benzine, paraffin, vaseline, and asphalt are by-products. Synthetic rubber is also made from petroleum. Many ships, trains, and trucks are now using fuel oil for power, and numerous homes today are heated with fuel oil.

For many years, when the petroleum industry was fairly young, kerosene which was used for lighting purposes was the industry's most important product. Then, when gas and electricity came into use, kerosene was almost forgotten. Recently, however, kerosene has again grown in importance because jet engines and some rocket engines use it.

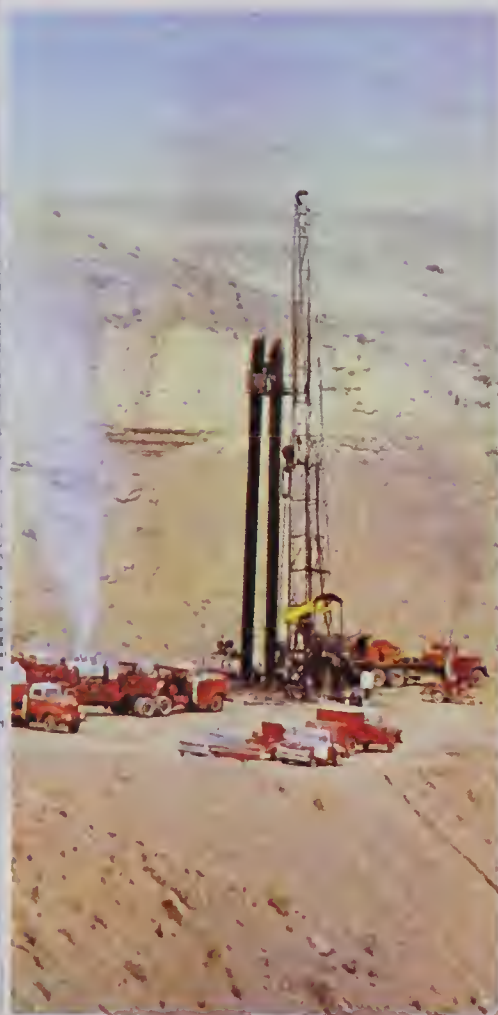
Many airplanes and most automobiles today operate on gasoline. Largely as the result of the automobile industry's growth, a vast demand for gasoline and other petroleum products has been created in the United States. About 65 billion gallons of gasoline and other motor fuels are used annually, and more gasoline is produced than any other petroleum product. Although the United States has vast petroleum resources, it must import petroleum and petroleum products each year in order to meet the demand for them. More than one billion dollars is spent each year to pay for imported petroleum!

Think what would happen if petroleum and petroleum products were no longer available! All the service stations would have to close, and automobiles and trucks could no longer run. Airplanes could no longer be flown, and most rockets would be grounded, too. Farmers would have to abandon their tractors. Many homes would

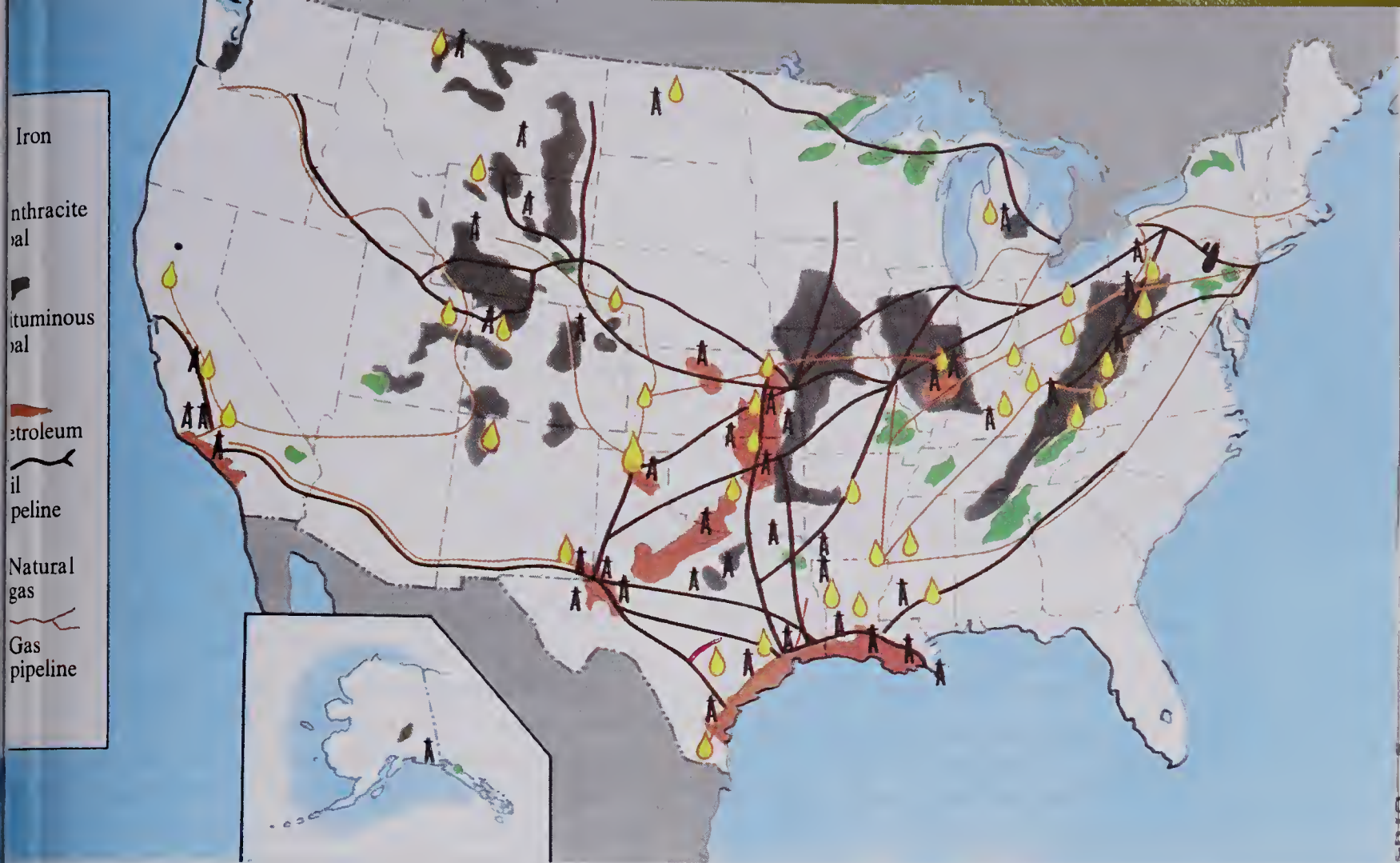




Men search constantly for oil from the air, on the land, and under the water. *Top right.* In mountain areas, the terrain is first studied from the air. Instruments in planes record the magnetic pull of the earth and indicate possible oil deposits. *Upper left.* Many wells need pumps to raise the oil to the surface. *Center.* An oil exploration crew in a desert area. Signs of an oil field may be found by studying the soil and rock formation. Shown at left is a desert test well. *Bottom.* Oil is often found under the ocean floor. Divers study the ocean floor and often take pictures of it. If the signs of oil are promising enough, drilling operations begin from platforms constructed over the water.







The map shows the location of major deposits of iron ore, coal, petroleum, and natural gas. Notice how the pipelines lead to the large cities.

be cold in winter months unless other fuels could be obtained. Electric motors, which are lubricated with oil and grease, would soon wear out. Synthetic rubber, many plastics, ink, paint, asphalt, insect sprays, and weed killers, which are made at least partly of petroleum, would no longer be available for use.

As you know, petroleum is found in pools or pockets underneath the Earth's surface. Petroleum fields may be near the surface, or thousands of feet below the surface. Today, petroleum geologists can predict where oil will be found much more accurately than they used to. Nevertheless, drilling for oil still is a costly process because many drilled wells never produce a single drop of petroleum.

The petroleum industry in the United States actually began in 1859 with the discovery of oil in western Pennsylvania. Oil City, situated at the junction of Oil Creek and the Allegheny River, became the first

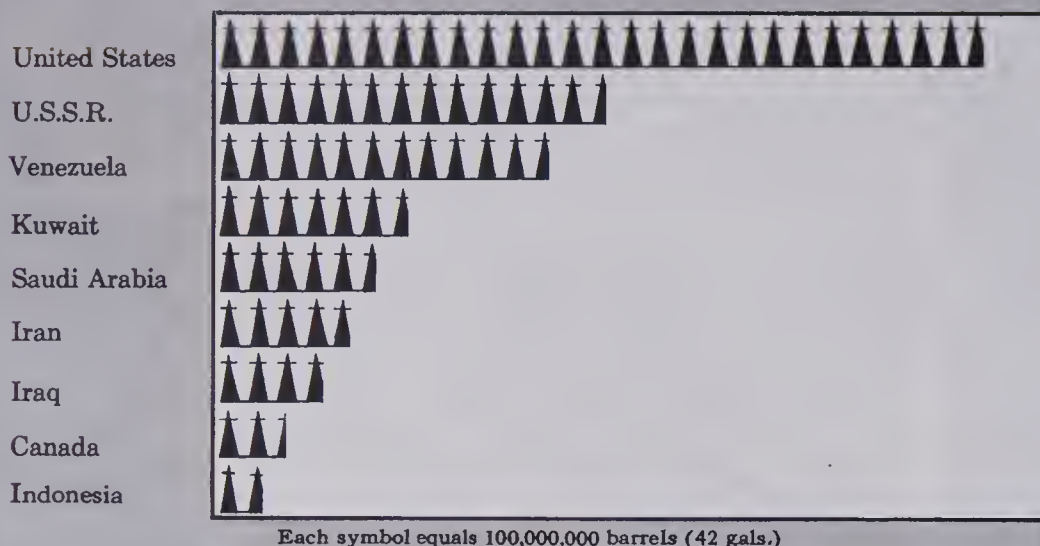
center for the industry. For many years, western Pennsylvania was the leading area in the oil industry. Then gradually other fields were opened to the south and west in Ohio, West Virginia, Kentucky, Indiana, and Illinois. The chief states in production of petroleum today are Texas, Louisiana, California, Oklahoma, Wyoming, Kansas, and New Mexico. Texas is by far the leading petroleum state, producing one-third

Drake's Well in Pennsylvania was the first successful oil well drilled in the United States.





## LEADING PRODUCERS OF PETROLEUM IN 1962



How many of the countries listed on this graph are in the Western Hemisphere? Which nations are in Asia?

of the total amount which is pumped from the ground annually. The state of New Mexico alone now produces as much petroleum as the country of Mexico.

Petroleum is transported in railroad tank cars, ocean tankers, and tank trucks, but most of it reaches refineries through pipelines. These form a great network extending in all directions across the country from oil-producing regions. (See the map on page 255.)

**Natural Gas.** You have learned that deposits of natural gas are often found in petroleum fields. Texas, Louisiana, Oklahoma, New Mexico, Kansas, and California are the leading states in the production of natural gas.

Natural gas cannot be stored and shipped as coal or oil is, although some of it is

These large, spherical tanks store butadiene, a gas made when oil is refined. Butadiene is used in making synthetic rubber.

now stored in underground caverns. Normally, natural gas is piped through miles of pipelines almost directly from the producing well to the consumer. Before being pumped to the consumer, natural gas is "stripped" of several other gases which are not needed to make the natural gas burn well. These include light gases such as propane and butane. Gasoline, kerosene, and diesel fuel also are taken from the natural gas and sold separately.

## THE RUBBER INDUSTRY

Rubber is one of man's most useful materials. It is used in making many different products because, when combined with other materials, it takes on very different characteristics. For instance, rubber can be made very elastic for use in rubber bands. It can be dissolved in a solution and used as rubber cement. It can be made tough and wear-resistant for use in tires. Thousands of products are made of rubber in the United States. People ride on rubber tires, they walk on rubber heels and soles, and wear rubberized coats and caps during rainstorms. Rubber is used in cushions, mattresses, and pillows. It is used to insulate electric wires, to provide padding under rugs, and to make balls, gloves, paint, jar rings, hoses, belts, and many other useful products.





**Two Kinds of Rubber.** Two kinds of rubber, natural rubber and synthetic rubber, are used by the rubber industry. Most natural rubber comes from trees grown on plantations in Southeast Asia and Africa. Some is obtained from trees growing wild in the tropical rain forests of Central and South America and Africa. Small amounts are also obtained from other plants.

Synthetic rubber is made by a chemical process. About two million tons of rubber was used in the United States in 1962. Of this amount, about one-fifth was imported natural rubber and most of the rest was synthetic rubber.

**Natural Rubber.** Most natural rubber is obtained from a tree which was native to Brazil. Seeds from these trees which were found in the Amazon forests were used to start rubber plantations in other parts of the world. Indonesia, Malaysia, Thailand, Ceylon, and Viet-Nam are leading countries in the production of natural rubber. Two of the largest manufacturers of rubber products in the United States have established their own rubber plantations in Liberia.

When the rubber tree is tapped, a liquid called latex flows from it. Some latex is shipped to the United States in liquid form. If dry rubber is desired, the latex is poured into a tank with an equal quantity of water

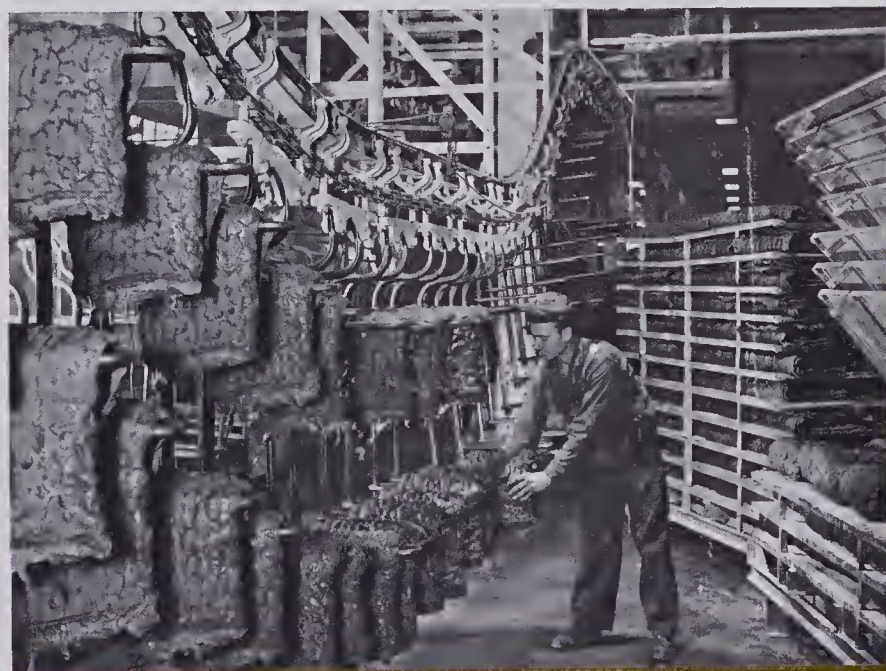
and a small quantity of acid. The acid causes the rubber to congeal or curdle, much as milk curdles when vinegar or some other acid is added to it. The curds of rubber float to the top of the mixture and are then removed, washed, put through rollers to remove moisture, and thoroughly dried. This crude rubber is then smoked or treated with chemicals to preserve its qualities.

A small amount of natural rubber is collected each year from rubber trees in tropical rain forests. Natives collect the latex from the trees and prepare rubber from it. They add the latex, a little at a time, to the end of a stick while holding it over a smoking fire. The rubber congeals or hardens during the smoking process, and a large ball of solid rubber eventually forms on the end of the stick. These balls of crude rubber are then collected in rubber-gathering centers and taken to market.

**Synthetic Rubber.** Several kinds of synthetic rubber can be made from different materials, including coal, petroleum, natural gas, alcohol, potatoes, and molasses. Most of the synthetic rubber manufactured in the United States is made from petroleum. Synthetic rubber differs from natural rubber and, for some purposes, it is as good as, or better than, natural rubber. Synthetic rubber is not damaged by gasoline and oil as much as is natural rubber.

The man in the center is sending natural and synthetic rubber down a chute to a machine, in a room below, which will combine them.

These sheets of rubber have been made by combining natural and synthetic rubber. They will be aged before further processing.







A long sheet of processed rubber and cord, when cut and stitched together, is placed beneath a huge cylinder and pressed into the shape of a tire. The mold at right forms the tread pattern of the tire.

Natural rubber, though, is more elastic and this quality makes it better to use for many products. A combination of natural and synthetic rubber is better for many purposes than either kind used alone.

**Manufacturing Rubber Products.** When Europeans first discovered rubber and attempted to use it, it proved very unsatisfactory. It became hard and brittle in cold weather, and soft and sticky in warm weather. Then Charles Goodyear discovered that, when mixed with sulfur and heated, rubber retained its elasticity and other good qualities. This process of making rubber stronger and more durable is called **vulcanization**.

The rubber industry began in Akron, Ohio, in a plant which manufactured fire hoses. Bicycle tires soon became one of the leading products and, in manufacturing them, the industry gained very valuable experience. About half of the rubber used in the United States today is made into tires for automobiles, trucks, buses, airplanes, and machinery. The rubber industry has grown with the automobile industry. Many plants making rubber products have been built in all parts of the country, but the largest concentration of rubber plants is in Akron.

## QUESTION BOX

37

1. Why are aluminum plants usually located on or near large rivers or near the seacoast?
2. What states in the United States lead in mining ores used in producing (a) aluminum; (b) copper; (c) zinc; (d) lead; (e) uranium?
3. Why has uranium not yet become an important source of industrial power?
4. What are several reasons why the automobile industry has become such a large one in the United States?
5. How has the automobile changed ways of living in the United States?
6. What sorts of changes would have to be made in living in the United States if the supply of petroleum were to be used up tomorrow?
7. What products are obtained in the refining of petroleum?
8. Why is rubber one of the most useful materials known to man?
9. What differences are there between natural and synthetic rubber?
10. How is about half of the rubber used in the United States?



## THE AIRCRAFT INDUSTRY

Another of the largest and most important industries of the United States is the aircraft industry. Most of the planes flown by commercial airlines of the world are manufactured in the United States. In addition, the aircraft industry manufactures small planes for pleasure and business use, military aircraft, and missiles. Today the aircraft industry employs more than 700,000 workers, and the value of its products often is more than that of the automobile industry. Furthermore, about four times more money is spent each year on research and development by the aircraft industry than is spent by automobile manufacturers.

The aircraft industry became large during World War II, but its beginnings can be traced back to 1903. In that year, on the sandy coast of North Carolina, Wilbur and Orville Wright made the first successful flight in an airplane. These brothers, by watching birds and by study and experimentation with gliders, had discovered the secret of flying. They designed and built a crude, fragile airplane. Though almost totally unlike modern planes in appearance, the first successful airplane was built using the same principles that are used today by aircraft manufacturers. The Wright machine was a biplane, which is a type of airplane with two supporting planes or wings. This type of airplane was in use for many years before monoplanes, now in common use, were perfected and put into the air. Monoplanes have only one supporting wing.

Unlike the automobile, the airplane did not gain rapid public acceptance as a means of transportation. Because early planes often crashed, most people thought flying was only for the foolhardy. Such doubt and fear had to be overcome by building machines which worked consistently and were safe. For many years,

FLYING MACHINE SOARS 3 MILES IN TEETH OF HIGH WIND OVER  
SAND HILLS AND WAVES AT KITTY HAWK ON CAROLINA COAST



The Wright Brothers' plane flew 120 feet on the first trial. Is there a mistake in the newspaper headline? *Above.* This monoplane is the one in which Lindbergh made the first non-stop solo flight across the Atlantic. *Below.* Because of the speed and convenience of private planes, they are used frequently for business and pleasure trips.







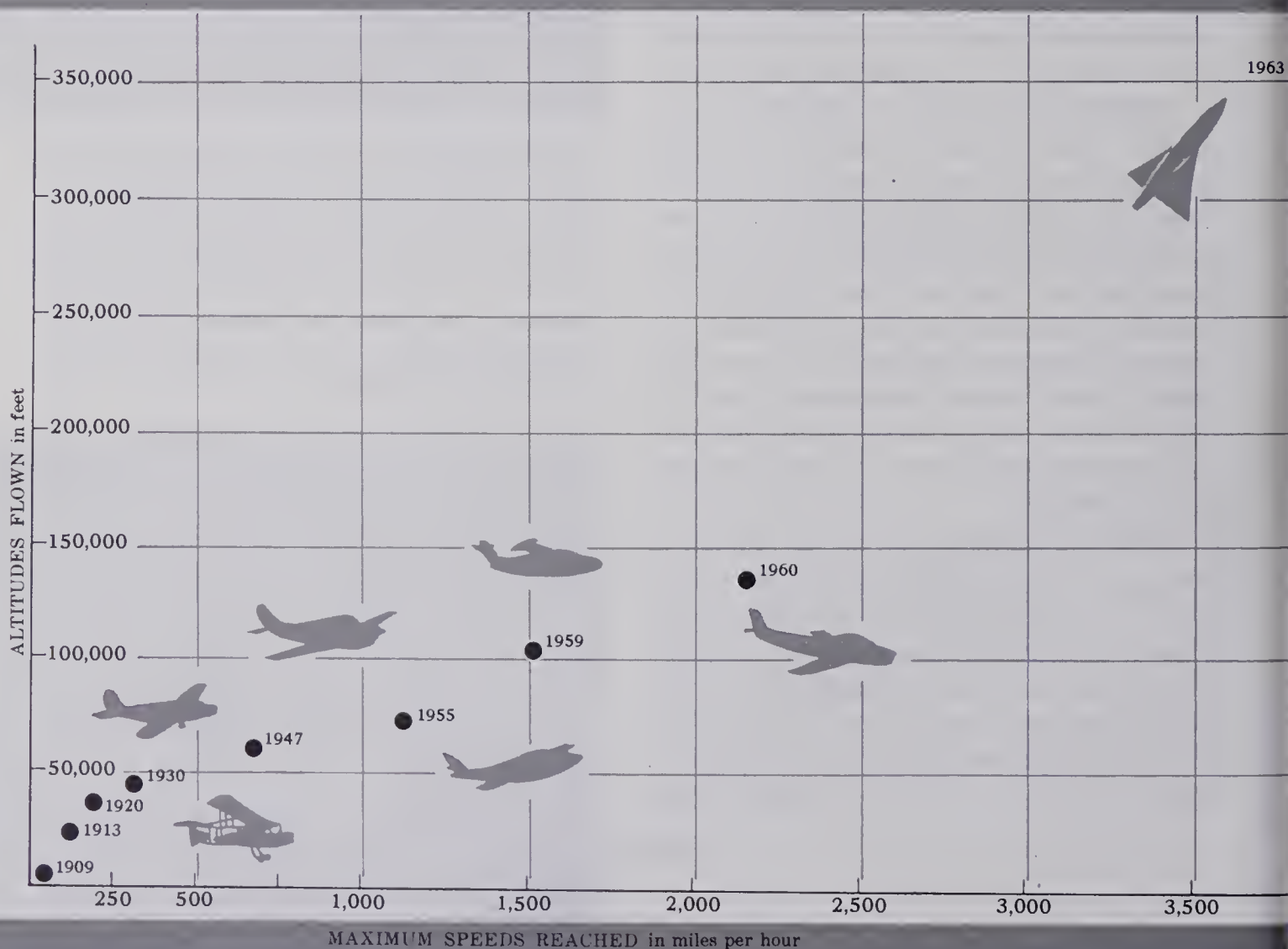
These people are boarding a jetliner at Los Angeles International Airport. Transcontinental jet flights have been made from Los Angeles to Baltimore in only about three and one-half hours time.

businessmen hesitated to invest money in the aircraft industry. Until large amounts of capital were secured, the aircraft industry remained small and insignificant to the nation's industrial scene.

Today the United States has more than 800,000 people with licenses to fly. There are more than 8,800 airports, of which almost 3,000 are used by commercial airlines. In a recent year, there were more than 125,000 non-military planes in the United States. These flew in a year's time more than  $1\frac{1}{4}$  billion miles, using about 280 million gallons of gasoline! Commercial airlines were so safe that, on the average, only one passenger was killed for every billion miles flown.

The pictograph shows advances made in power-driven aircraft performance over a period of years. Undoubtedly, this progress will continue.

### PROGRESS IN AIRPLANE PERFORMANCE, 1909-1963





**A Complicated Machine.** The modern airplane is a very complicated machine with thousands of parts, each of which must be made with the greatest of care. For example, a single-engine, propeller-driven plane has about 15,000 parts in its fuselage or main framework. The engine of such a plane has about 6,000 parts, and the propeller has about 190 parts. In addition, there are more than 90 instruments, knobs, switches, and controls. Larger airplanes have still more parts. Generally, it takes from a year and a half to two years to design and construct a large plane. After the first plane of a design has been constructed, of course, others can be built much more rapidly.

Many different materials are used in building an airplane. The outer surface of the plane usually is made entirely of metal, generally of lightweight metals such as aluminum and magnesium alloys. Stainless steel is used where great strength is needed, and many other metals are used for particular purposes. Plastics, wood, and fibers which are strong but lightweight are also used in manufacturing the instruments, switches, controls, and furniture which go into an airplane. Although assembly-line production methods are used in aircraft plants, an airplane moves along the assembly line much more slowly than an automobile in an assembly plant.

**Major Centers of Production.** During and after World War II, the need for military planes and the increasing use of airplanes for transportation caused the rapid growth of the aircraft industry. Aircraft plants in which planes are designed and produced are found today in a number of cities. Among the major centers are Los Angeles, San Diego, Seattle, Wichita, Baltimore, Long Island, and Buffalo. Aircraft plants are also found in other cities on the Great Lakes, and in Oklahoma, Texas, Missouri, and Georgia.



Shown on the wing of this plane are some of the complex instruments used in a modern fighter plane.

The airplane assembly plants must be large because of the size of the planes. They also need to be near an airfield where the planes can be tested. Transportation to market is a minor problem, since the finished plane can be flown anywhere.

Most airplane companies purchase many parts for their planes from other manufacturers. Many of the parts are made by automobile manufacturers. Certain companies specialize in making engines. Most of the engines and most propellers, too, are made in or near the iron and steel manufacturing centers in the eastern part of the United States. Many parts manufacturers have built their factories near the assembly plants to cut transportation costs. This is true especially of companies which make bulky parts such as wings and tails. Other parts which are light in weight can easily be shipped longer distances from the parts factories to the assembly plant.

**Airplanes Increase in Size and Speed.** The pictogram on page 260 shows how airplanes have increased in speed, range, and possible altitude since the days of Orville and Wilbur Wright. As the pictogram indicates, progress in airplane performance has been especially marked during the past twenty years.





Helicopters are often used to deliver supplies to places which are difficult to reach by land.

Progress in the coming ten years undoubtedly will be even more rapid. The most dramatic developments probably will be made by rockets produced by the aircraft industry rather than by airplanes. As you know, rockets now are used to place satellites in orbit around the Earth to study radiation, weather, and other aspects of outer space. Super-powered rockets have carried pay loads completely beyond the Earth's gravitational pull. Already man has used rockets to venture a short distance into outer space. In recent years, most of the larger aircraft companies have concentrated part of their attention on rockets. One large company recently built its last airplane and is now producing only rocket-powered craft.

Pilots who fly at very high altitudes wear special clothing to insure their safety and survival.



The speeds now attained by airplanes are astounding when one realizes that man has been flying only about sixty years. Speeds achieved by rocket-powered missiles are about ten times greater than those of the fastest planes. As yet, however, man has not worked out a truly safe way of launching and landing a rocket-powered machine. For this reason, and to provide rapid transportation between cities within the nation, the aircraft industry will undoubtedly continue to build many airplanes.

**Other Kinds of Aircraft.** In recent years, much research has been done in developing not only rockets but also planes which do not require long runways. The helicopter, which has revolving blades to lift it into the air, is the most successful of these craft. The helicopter can rise from and descend onto a small space. In some large cities, helicopters provide commuter service between airports and from airports to the center of the city. Airplanes which take off vertically and then fly horizontally after achieving altitude have also been built. Some of these planes are built with motors which change position after take-off to permit level flight.

Another type of aircraft is lifted by gases which are lighter than air, and is moved through the air by propellers. Such an airship is called a **dirigible**, a word which means *steerable*. Since dirigibles are much slower than most airplanes, they are useful for particular purposes. By cutting or reversing the engines, they can be made to hover over a spot. Dirigibles are used mainly by the Navy today. Most dirigibles used in the United States are inflated with helium, a very light gas which does not burn. The United States has the only known helium wells in the world, mostly located in Texas, Kansas, and New Mexico. The United States government controls the production and distribution of helium as a conservation measure.

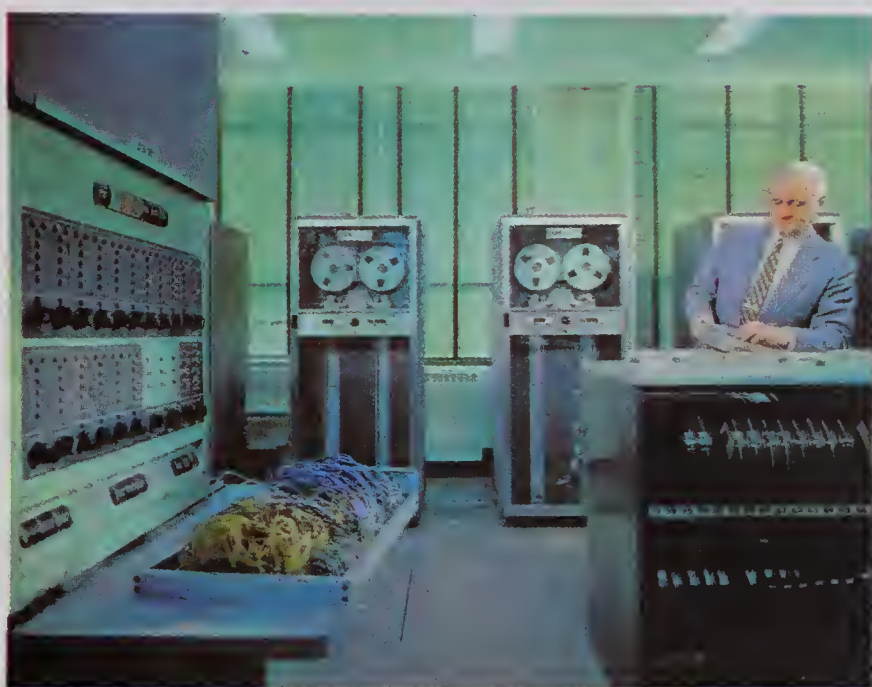


## ELECTRICAL PRODUCTS INDUSTRY

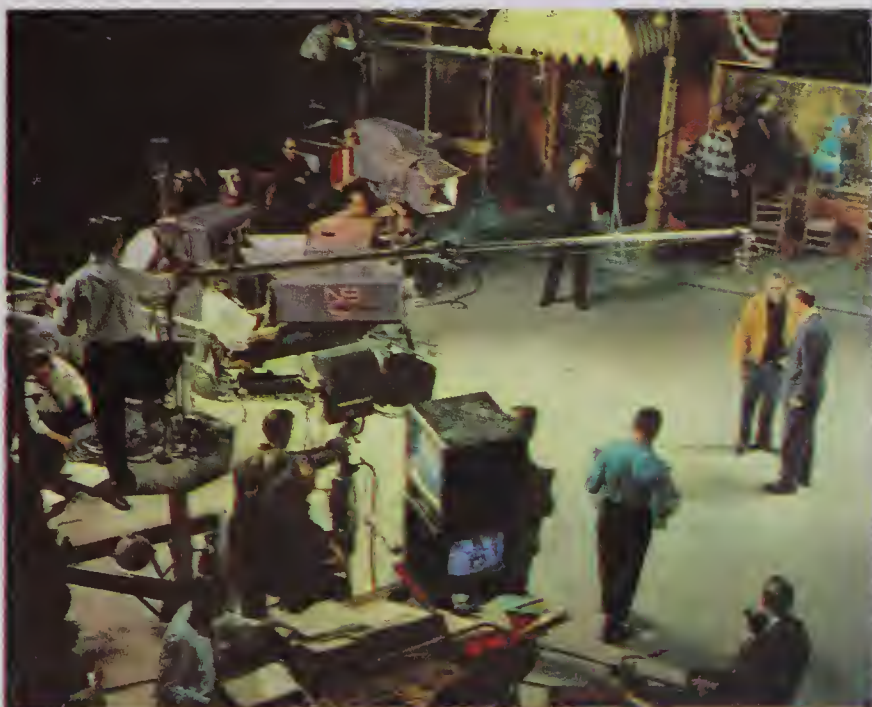
The electrical products industry in the United States produces motors, appliances, and many other products which operate on electricity. If you think of all the electrical products and appliances in your home, you will begin to understand what a large industry this is. Products such as electric light bulbs, clocks, stoves, refrigerators, toasters, razors, mixers, television sets, radios, and record players, are all made by the electrical products industry. Such appliances, except for those which have to do with communication, actually are a minor part of the total production of this industry. By far the greatest number of workers in this industry either make machinery for other industries or produce communications equipment. In a recent year, the industry's million employees produced goods valued at more than thirteen and one-half billion dollars. About one-third of this production was communications equipment. The electrical products industry thus serves many other industries, providing essential parts of many finished products.

The fastest growing branch of the electrical products industry is the electronics industry. Electronics is the science of using electricity. For many years, different kinds of tubes have been used to transmit sound or pictures, or to perform certain other electrical functions. A few years ago transistors were developed. Transistors are electronic devices which perform most of the same functions that tubes do, but require much less power and are much smaller in size. As a result, many marvelous developments have recently occurred in electronics.

**The Uses of Electronics.** Machines operated electronically are used today in many factories to control the flow of materials and to regulate the quality of the products.



*Top.* It takes highly trained workers to repair electronic equipment and to rewire it each time it is used for a new purpose. *Center.* This computer is used to calculate the cost of producing automobiles. *Bottom.* Plays produced in well-equipped studios can be transmitted to homes across the nation by the television networks.







Tiny transistors now replace tubes 200 times larger in many electronic devices.

Tiny, lightweight electronic masterpieces are used to guide missiles from their launching pads into space. Other electronic "brains" receive messages from missiles after launching, figure rapidly whether the missile is on course or not, and send needed directions to change or maintain flight direction. In a few moments, electronic computers can solve mathematical problems which would take men with calculators as long as a year to solve. Computers can be used, too, to predict what will happen if certain conditions occur. They are being used now, for instance, to improve weather predictions.

Developments in electronics make it possible for you to dial a long-distance telephone number directly, and to speak over

Many instruments on this panel are electrically powered. The automatic pilot can be set so that the plane follows a radio beam.



the telephone without shouting. Electronic microscopes make it possible for scientists and doctors to see very small substances which had not been visible under ordinary microscopes. Pictures of broken bones and of internal organs can be taken by electronic equipment. An airplane can fly on electronic skyways or beams, controlled during most of the flight by an electronic pilot which holds the plane automatically on course. Another electronic development, radar, guides the pilot safely to the runway in cloudy or stormy weather.

**Rapid Developments Probable.** In recent years, large sums of money have been spent on research and development in electronics. Only the aircraft industry spends more money on research. Much of the money spent on electronics has come from the United States government in connection with missile programs. However, large sums are spent also by private industries simply to learn more about electricity and its possible uses. One company, for instance, has spent millions of dollars developing a battery which is powered directly by sunlight. Many homes may someday be heated, even during the coldest winter months, by solar batteries which convert sunlight into electricity. Other uses for electricity, as yet unknown, undoubtedly will result from research now under way.

**Major Centers of the Electrical Products Industry.** Thousands of factories produce the many, many electrical products manufactured in the United States each year. About two-thirds of these factories are located in the Middle Atlantic States. Many others are located along the Great Lakes and on the west coast. Most of the factories are located near other industries which need electrical machinery or parts. Nevertheless, many small plants which make electrical parts needed by larger factories are scattered throughout the United States.



## THE CHEMICAL INDUSTRY

Day after day in many factories and research laboratories, chemists are conducting experiments and making new discoveries. This research has made possible the large number of products manufactured today by the chemical industry. The soap we use to wash our hands is made today by a chemical process and probably is scented with a synthetic perfume. Those of us who live in cities drink water which might be purified with chlorine, a chemical. The bread we eat is enriched with vitamins which are made by a chemical process. The shoes we wear may be made of leather tanned by a chemical process and colored with synthetic dyes. Many stockings are made of rayon or nylon, both chemical products. Toys may be made of plastics which are chemical products.

These are just a few of the products which modern chemistry has made possible. Because many excellent substitutes for scarce natural products have been developed by chemists, we enjoy many things we would not otherwise have. For instance, beautiful plastics are now used instead of ivory, and rayon or nylon is used in place of silk. Developments in chemistry also have made possible an increase in production of food crops and the destruction of harmful insects. A list of ways in which chemistry has helped industries would be a long one, indeed.

**The Work of the Chemist.** Through long years of study, chemists have learned that substances result from different combinations of the Earth's elements. If a chemist wishes to produce a substitute for a scarce natural material, he first studies it to find out the elements of which it is composed. Then he extracts those elements from other more common materials and combines the elements to form the substitute for the natural material.

**Some Chemicals and Their Uses.** The raw materials used in making most chemicals are usually abundant and inexpensive. Many of the chemicals produced in the United States are made in large quantities for use in manufacturing industries. These are known as industrial chemicals. The more important minerals used in the manufacture of industrial chemicals are sulfur, pyrites, salt, coal, phosphate rock, saltpeter, and limestone.

Sulfur and pyrites are used to make sulfuric acid, one of the most important industrial chemicals. Sulfuric acid is used in refining petroleum, in the iron and steel industries, and in manufacturing paints, textiles, certain chemicals, and coal products.

Salt is made into caustic soda and chlorine. Caustic soda is used in making rayon, in making paper, and in mercerizing cotton thread and textiles. Mercerizing helps to make fibers stronger and easier to dye. Caustic soda combined with limestone furnishes bicarbonate of soda and soda ash. Soda ash is used in manufacturing wood pulp, glass, and chemicals. Chlorine is used in bleaching textiles and for purifying water.

Coal tar, a by-product obtained in coking coal, is a material from which hundreds of chemical products are made. Some of the best known of these products are dyestuffs, perfumes, aspirin, sulfa drugs, carbolic acid, saccharin, certain kinds of paints, plastics, and explosives. Coal tar also is a source of acids and other products used in industries.

**Fertilizers.** One of the most important contributions of the chemical industry has been in the production of mineral fertilizers. At one time, the United States depended on Chile for almost all of its nitrate supply. Then, two ways of taking nitrogen from the air and producing synthetic nitrates were developed. Now the greater





*Above.* Synthetic fibers are manufactured in this chemical plant in Alabama. *Right.* The chemist is searching for a way to improve a process for refining petroleum to obtain gasoline. *Below.* A miniature petroleum-cracking unit is studied in a laboratory to determine the best and most efficient layout and design for refinery equipment.



part of the nitrate supply in the United States is produced synthetically.

Super-phosphate and phosphoric acid, used as fertilizers, are made by adding sulfuric acid to phosphate rock. Phosphate rock is found in Florida, Tennessee, and a number of western states.

Potash is a third valuable fertilizer. It is also used in making soap, in bleaching and cleaning, and in manufacturing a number of products. Years ago, housewives used to soak wood ashes to obtain potash, which they called lye, and boil it with fats to make soap. At one time, Germany supplied most of the world's potash from potassium salt deposits in that country. Several states in the United States, including New Mexico, California, Utah, and Michigan, mine potassium salts.

Plastics. One of the largest branches of the chemical industry is the manufacture of plastics. The plastics industry has had a remarkable growth in the last twenty years, and is continuing to develop rapidly. This industry started during the nineteenth



century with the manufacture of celluloid to take the place of ivory. Unfortunately, celluloid burns easily and so it was unsuitable for many uses. Chemists continued their studies and finally produced plastics that would not burn when heated.

Now many different types of plastic products, which can be designed to meet particular needs, are made. Plastics are used in thousands of products, including radios and television sets, electrical appliances and machines, automobiles, airplanes, furniture and household furnishings, and clothing. Many plastics are used as adhesives to hold parts of products together. A housewife may wear a dress which has plastic buttons, and protect it with a plastic apron. She may use a plastic covering to protect the furniture in her home. On a rainy day, she may wear a plastic raincoat to a supermarket. She may carry a plastic handbag, and buy food wrapped in plastic coverings. After returning home, she may place the food in plastic boxes and store it in the refrigerator which probably has some plastic parts.

Plastics are made from many materials. The raw materials most frequently used include coal, petroleum, and cellulose which is obtained mainly from wood. Some plastics soften and lose their shape when subjected to heat; others, known as heat-hardening plastics, do not even warp when hot.

**Location of the Chemical Industries.** Until recently, most chemical industries in the United States were located east of the Mississippi River, especially in the leading manufacturing states of the northeast. Chemical industries based on salt developed in New York and Michigan where salt deposits are abundant. Those industries based on coal naturally grew in the coal-mining region of the Allegheny Plateau.

Today, however, chemical industries are located throughout the country. Many

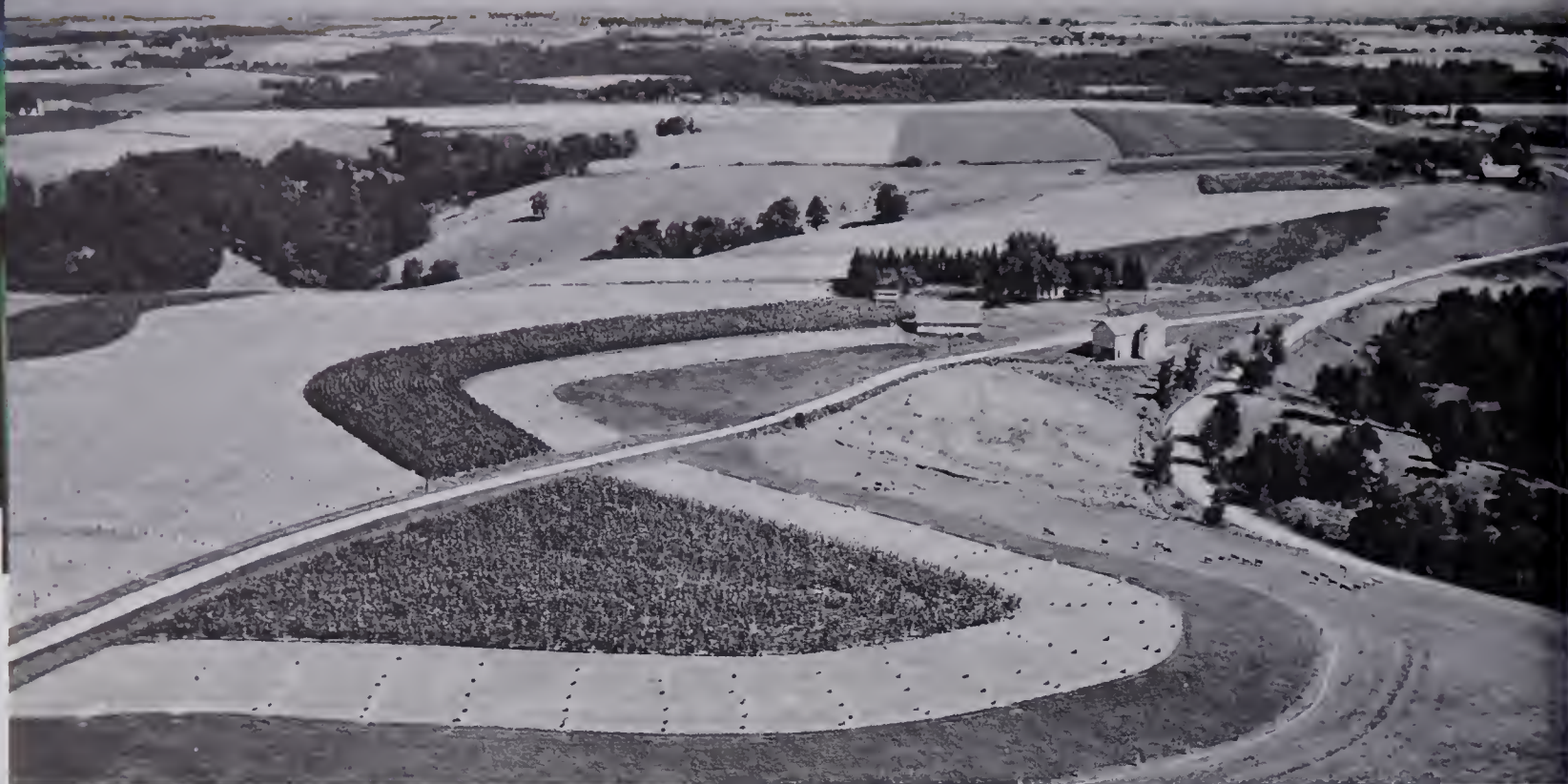
plants which make fertilizers have been constructed in the southern states where there is a great demand for fertilizers. Southern California and the Gulf coastal region in Texas now are major chemical centers. In both areas, petroleum is used not only for power but also as raw material in the chemical industries. The Gulf Coast of Texas especially has attracted chemical industries because sulfur and petroleum are found in that area. Industries there now extract magnesium and other chemicals from sea water. They also manufacture synthetic rubber from petroleum, glycerine from oil refinery wastes, and the synthetic fiber nylon from natural gas.

### QUESTION BOX

38

1. Why do you think more money is spent on research and development in the aircraft industry than in the automobile industry?
2. Why was the airplane slower to gain public acceptance than the automobile?
3. Why are aircraft engine plants often located thousands of miles from aircraft assembly plants?
4. Why will airplanes probably continue to be used for many years even though rockets are much faster?
5. What uses are made of electricity today which were not common only a few years ago?
6. Where are the major centers of production in (a) the aircraft industry; (b) the automobile industry; (c) the petroleum industry; (d) the electrical products industry; (e) the chemical industry?
7. What are the main raw materials used by the chemical industry?
8. What are the major products of the chemical industry?





Fertile, gently rolling farmland such as this is found in many parts of the United States. Does the picture show any practices which conserve the soil?

## AGRICULTURE AND RELATED INDUSTRIES

Everyone who lives in a city depends, partly at least, on farmers for his food. Throughout Latin America, as you have learned, a majority of the people in every country make their living from agriculture. By contrast, only twelve per cent of the people in the United States live on farms and only about eight per cent are actually farmers. Nevertheless, through modern methods of agriculture, the farmers of the United States produce a great deal more per worker than do the farmers in Latin America. As a matter of fact, the problem of farm surpluses, or having more food than is needed, is one of the major agricultural problems of the United States.

**Agricultural Regions.** The United States has not only a great variety of land surfaces and different kinds of soil, but also a wide range of climates. According to the nature of the land, the climate, and principal crops, the United States can be divided into a number of agricultural regions.

These regions are shown on the map on the next page. As you look at the map, understand that only the major crops in a particular region can be shown.

As the map shows, much of the land in the northeastern states is part of the Hay and Dairy Region. South of this region is the Corn Belt in the Midwest, and a region of general farming farther east. Non-irrigated fruit and vegetable farms are located along the New Jersey and New York coasts, along the southern coasts of the Great Lakes, and near the Gulf of Mexico. A similar region is located in southwestern Missouri and northeastern Oklahoma. Irrigated farms are scattered throughout the western states, especially in California. Much of the land in the southern part of the country is in the Cotton Belt, and most land in the West is grazing land. Portions of the Great Plains from the Texas Panhandle to the Canadian border and westward are the Wheat Regions.



## CEREAL GRAINS

Cereal grains are the edible seeds which grow on cereal grasses, such as corn, wheat, or oats. These grasses themselves are also called grains. Grains are used as food and as raw materials in manufacturing. Flour made from wheat and rye is used in making bread, and flour made from other cereals is used in making pastries, meal, and breakfast foods. Grains and their by-products are also used as feed for animals. Leading cereal crops in the United States are corn, wheat, oats, barley, rice, and rye.

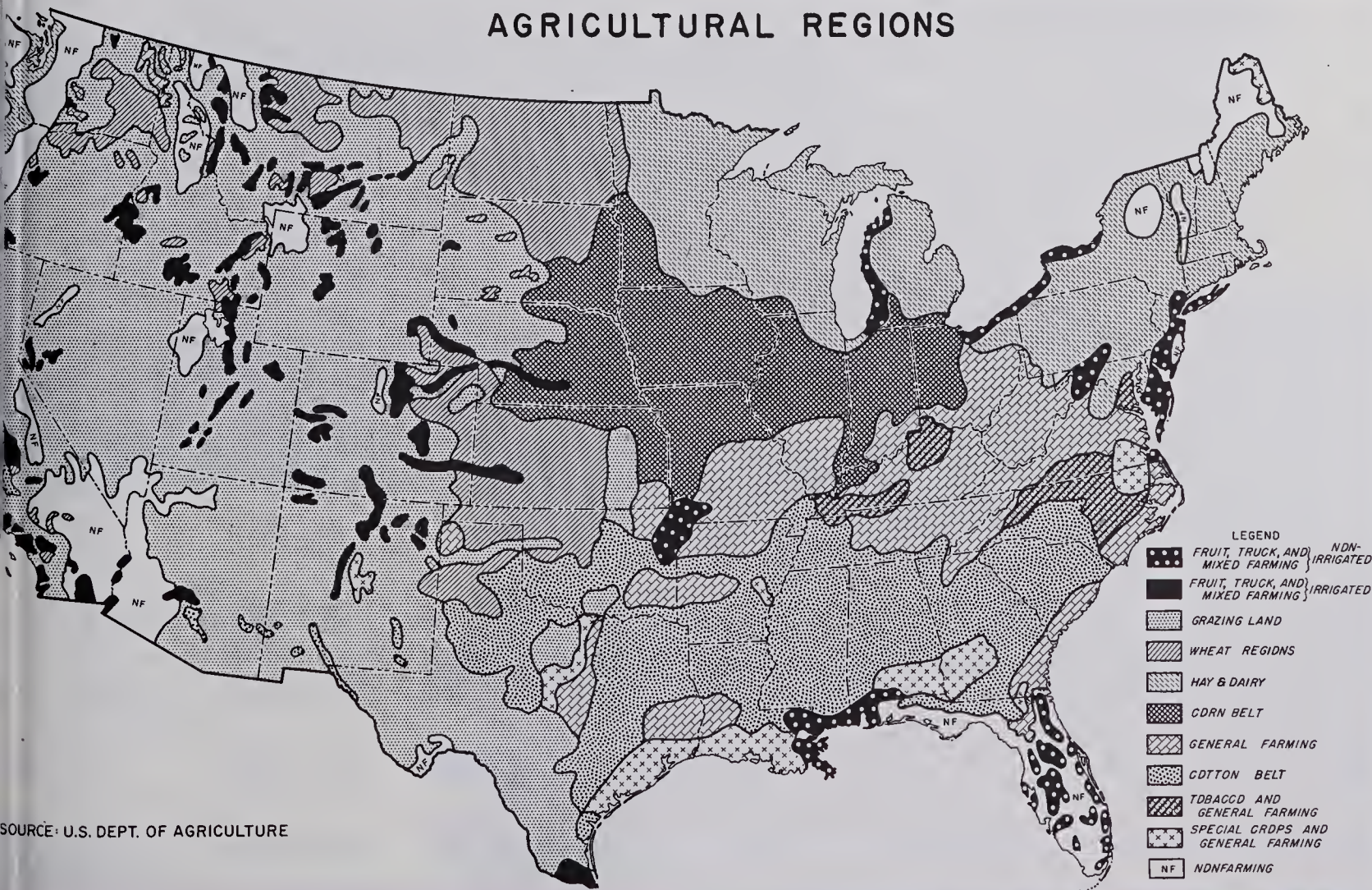
For thousands of years, men have raised cereal grains for food. Indians of the Western Hemisphere grew a kind of corn called maize long before the first Europeans arrived. Maize was carried back to Europe by the explorers, and early European settlers brought wheat, oats, barley, and rye to the New World.

**Corn.** Corn is the largest and most valuable crop raised in the United States. Almost half the amount of corn grown on the Earth is raised in this nation. Corn is grown in every state, but the area of heaviest production is that shown as the Corn Belt on the agricultural regions map on this page. As you can see, this area includes almost all of Iowa, and parts of Illinois, Indiana, Ohio, Michigan, Wisconsin, Minnesota, the Dakotas, Nebraska, Kansas, and Missouri. A considerable amount of corn is also grown in the Cotton Belt. Look also at the map on page 273 to find other areas in which corn is grown.

The type of corn now grown bears little resemblance to the Indian maize. Agricultural scientists have developed hybrid strains which have taller and stronger stalks and much larger ears of corn. Do you remember what a hybrid is? Corn is one of the most productive cereals that can be

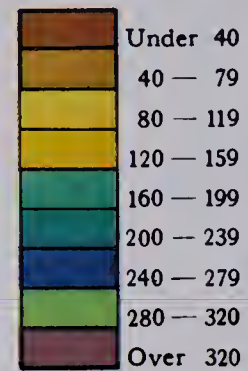
This map shows where the major crops are grown in the United States. Which crops are grown only in a few regions? In many regions?

## AGRICULTURAL REGIONS

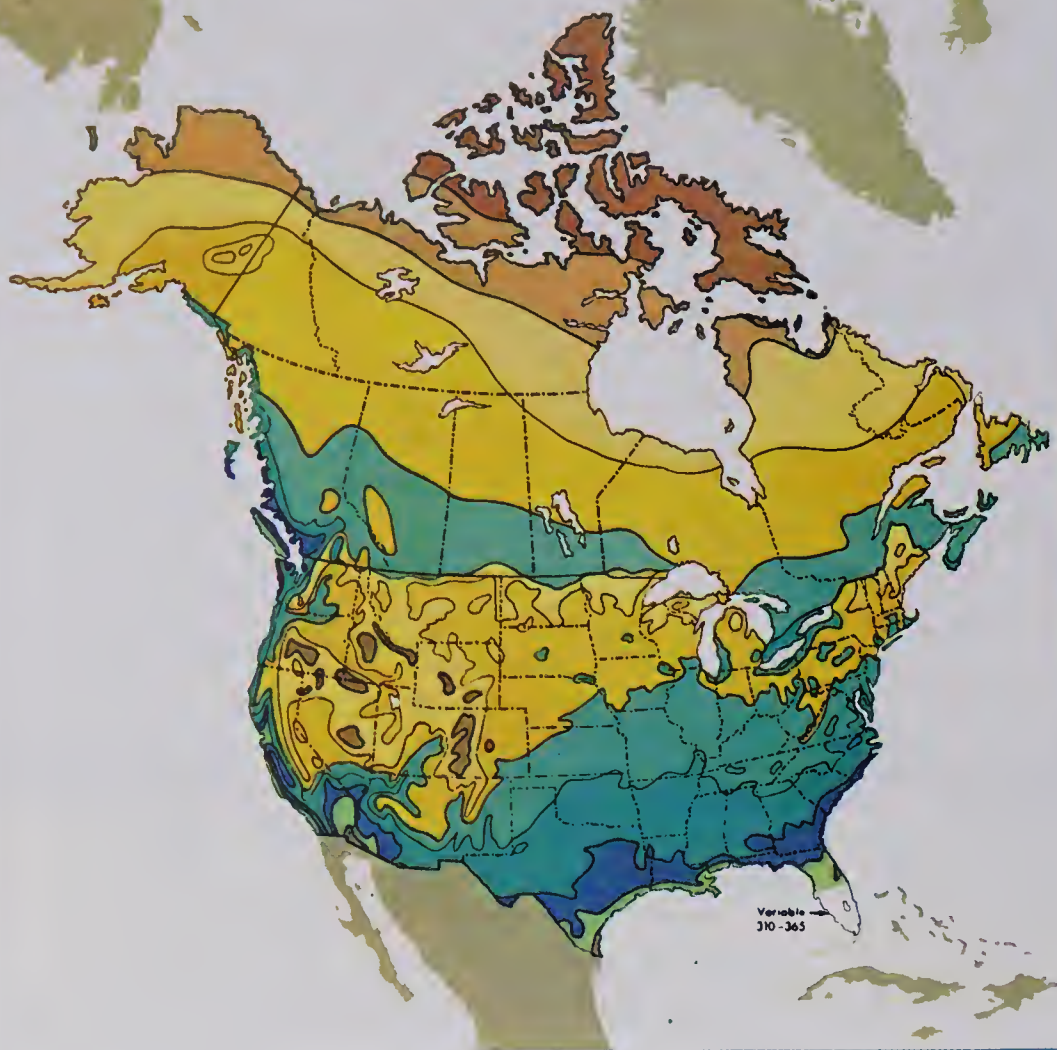




## GROWING SEASONS IN THE UNITED STATES AND CANADA



This map shows the average growing season in different parts of the United States and Canada. The growing season of a region can also be expressed in number of frost-free days. What is the average number of frost-free days where you live? What crops shown on the chart below can be grown in your state?



grown. In addition, the cornstalks make excellent feed for farm animals. Usually, farmers place the green cornstalks in silos where they ferment before being fed to the animals.






The United States is the world's largest exporter of corn, yet it usually exports only about one-tenth of its corn crop. Much of the corn raised in the United States is used to fatten meat-producing animals. Some of it is canned or frozen for people to eat, and some of it is used to make other products.

**Wheat.** As you have seen on the map of agricultural regions, wheat is a major crop in the Midwest and the Northwest. Two types of wheat are grown. The spring wheat area is that shown in Montana, North Dakota, South Dakota, and Minnesota. There, the wheat is planted in the spring because the wheat plants cannot survive the long, cold winters. Long sum-

mer days which occur in these latitudes cause the wheat to grow rapidly, and it is ready for harvest early in the fall.

The winter wheat area is that shown in Kansas, Nebraska, eastern Colorado, Oklahoma, Texas, and eastern New Mexico. There, the wheat is planted in the fall and is harvested the following summer. Winter wheat requires fairly low temperatures during its early growth, but it cannot

### SELECTED CROPS AND SUITABLE CLIMATE CONDITIONS FOR GROWTH

CROPS	GROWING SEASON IN DAYS	INCHES OF ANNUAL RAINFALL IN AREA GROWN
Spring Wheat 	90 - 150	15 - 30
Corn 	120 - 210	10 - 35
Sugar Beets 	160 - 200	20 - 35
Rice 	210 - 240	40 - 80
Citrus Fruits 	240 AND OVER	20 - 35*

\* IRRIGATION NEEDED  
IN ADDITION TO RAINFALL

FIGURES SHOWN ARE AVERAGES





Farms in the United States are the most highly mechanized in the world. Farmers today invest large amounts of money on equipment. The photographs on this page show some of the different kinds of farm machinery used. *Above left.* This tractor is equipped with a machine which spreads liquid nitrogen between rows of growing young corn. *Above.* Corn reaches maturity in late summer depending on the latitude of the area. It is sometimes harvested by machines like this picker, which picks the ears of corn and husks them, all in one operation. *Left.* A combine cuts and threshes a field of oats. Oats are usually harvested before the corn crop.

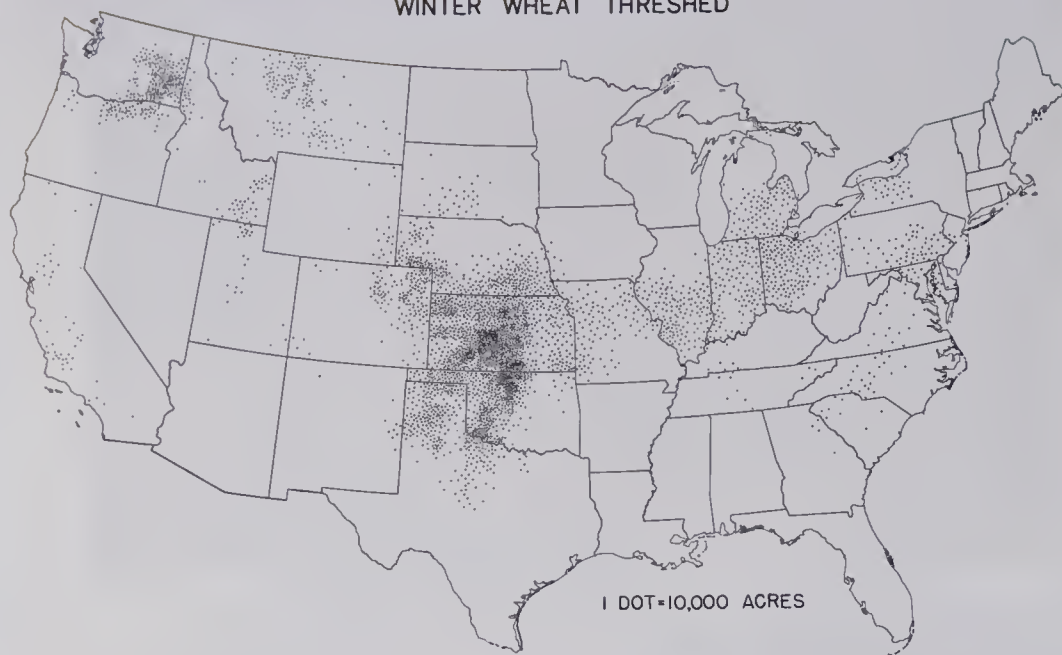


*Above.* A combine blows threshed wheat onto a truck that moves along with it. Machines like this make possible the harvesting of vast fields of grain. *Right.* This wheat is being harvested in the early summer. Is it spring or winter wheat?





# WINTER WHEAT THRESHED



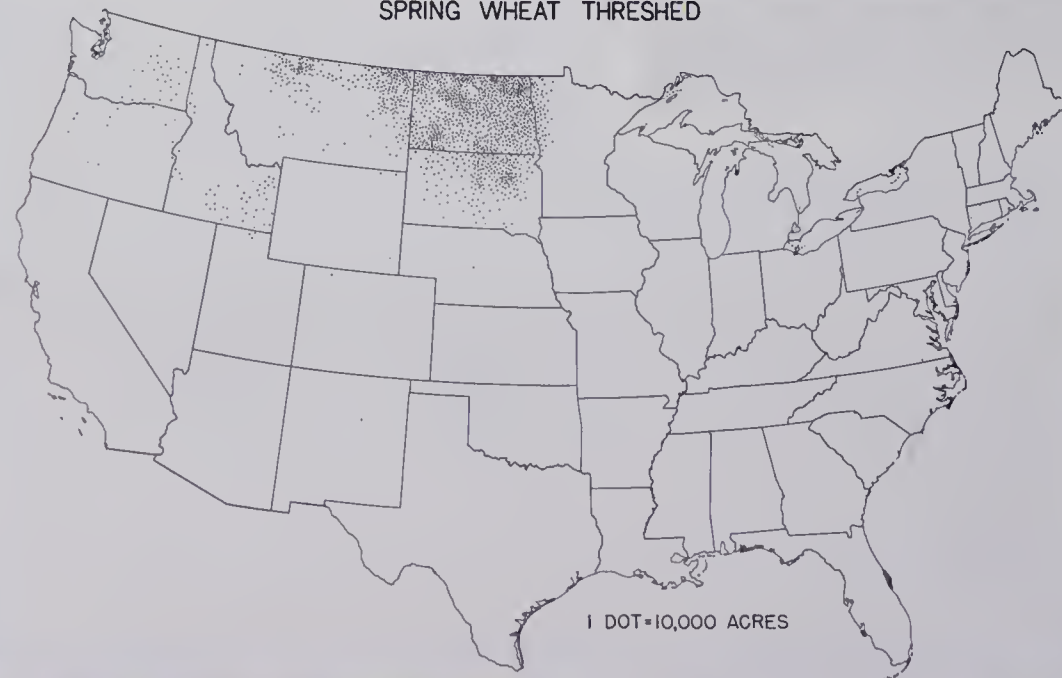
Winter wheat is grown in regions that have winters in which the frost does not penetrate deeply into the soil and damage the young roots.

Leading world producers of wheat, corn, and oats are shown on this graph. Also, average yields per acre are given for each crop in each country.

LEADING COUNTRIES IN WHEAT, CORN, AND OATS PRODUCTION*		
(WITH YIELD PER ACRE OF EACH COUNTRY)		
CROP	Yield per Acre (bu.)	Production in 100 million bushels
		5 10 15 20 25 30 35 40 45
Wheat	9.4	U.S.S.R.
	25.1	U.S.A.
	26.2	Canada
Corn	67.3	U.S.A.
	22.3	U.S.S.R.
	21.0	Brazil
Oats	45.1	U.S.A.
	47.8	Canada
	18.2	U.S.S.R.

\*1963 Estimates

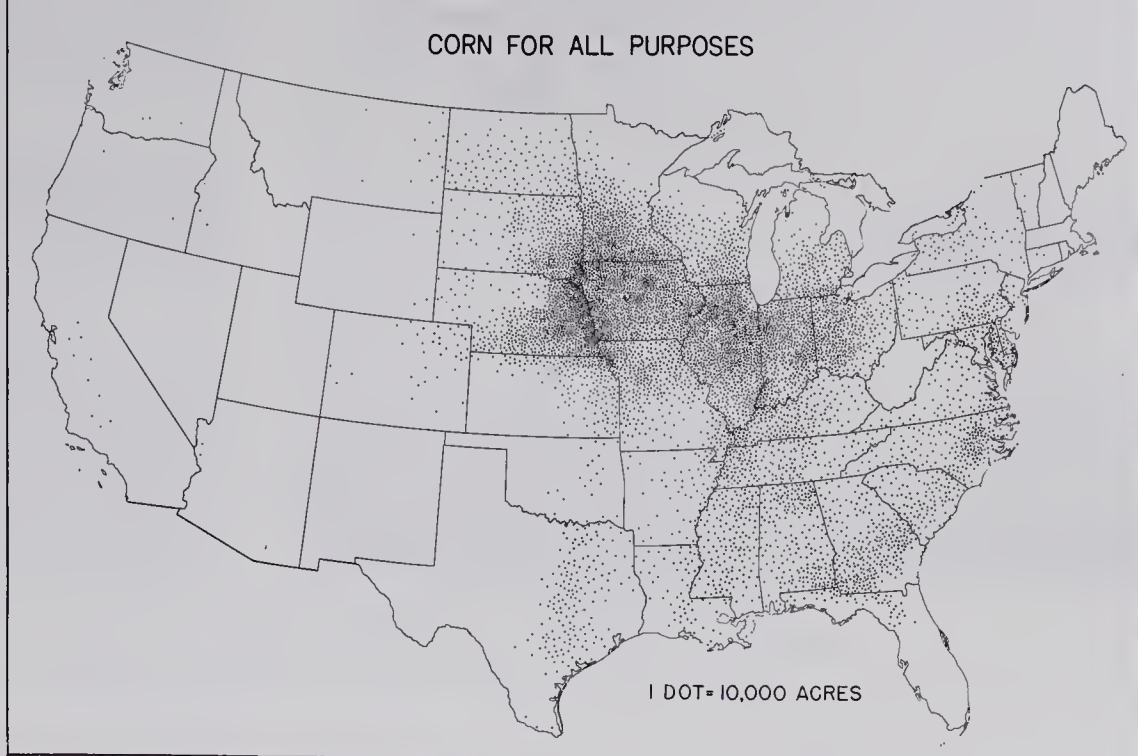
# SPRING WHEAT THRESHED



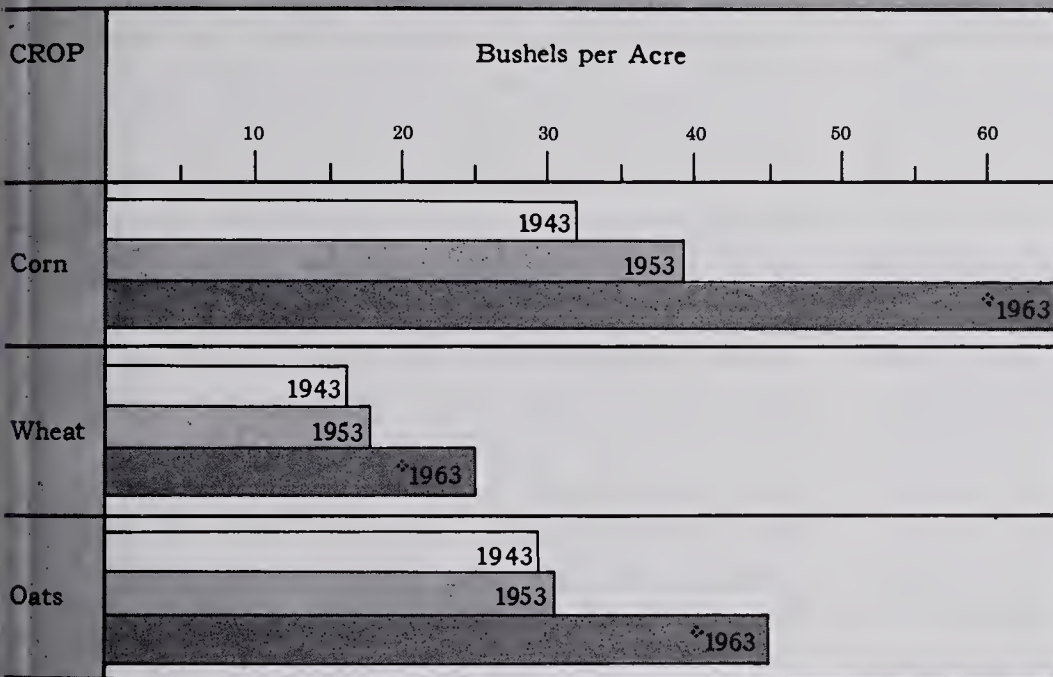
Note where spring wheat is grown in the U.S.A. Not much winter wheat is grown in these areas because it will not survive the cold winters.



The states in which large amounts of corn are grown are also the states having large numbers of farm animals, especially hogs.

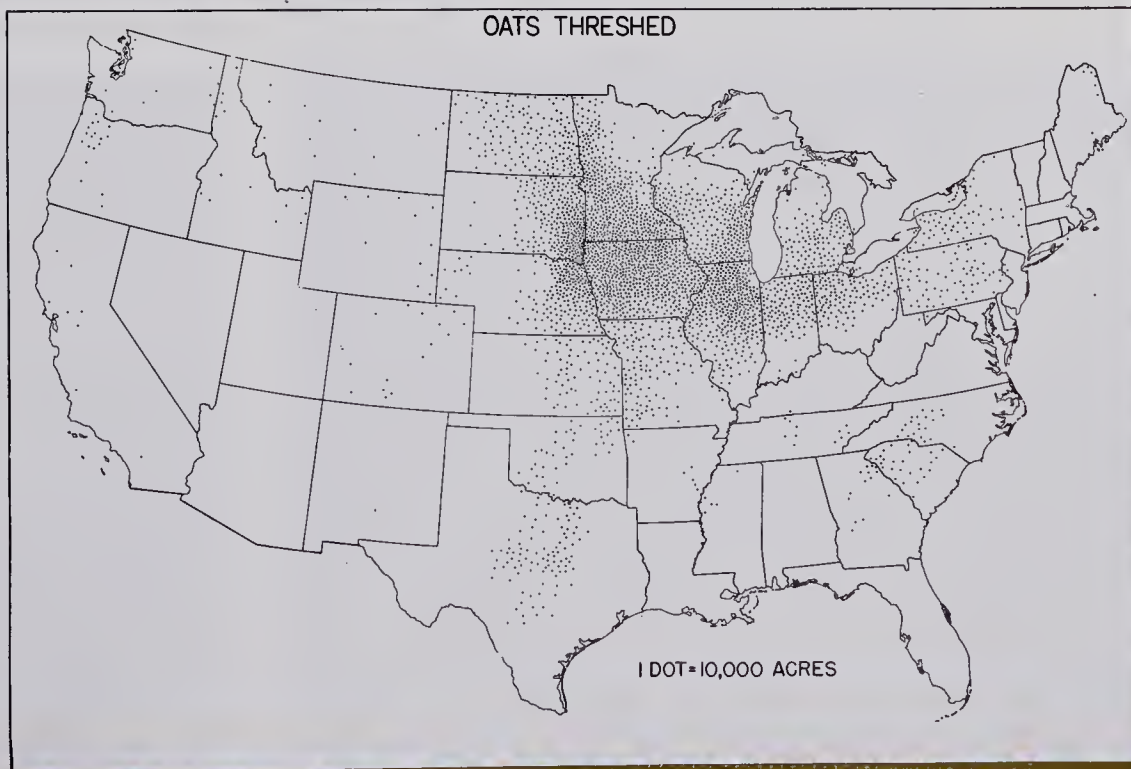


### AVERAGE YIELDS PER ACRE IN CORN, WHEAT, AND OATS IN THE UNITED STATES INCREASES DURING SELECTED YEARS

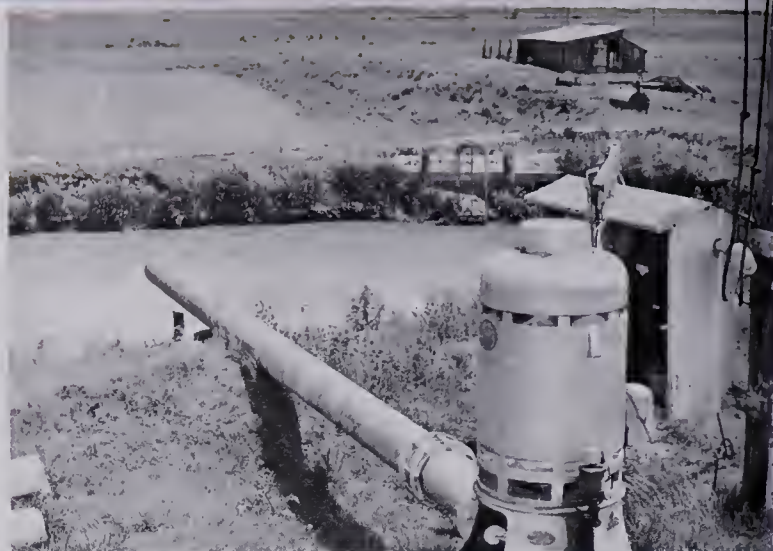


This graph shows the increases in average yields per acre of corn, wheat, and oats in the United States from 1943 to a recent year.

States that grow large amounts of oats are usually corn-growing states as well. A large portion of the oat production is used in cereals.







Rice is sown from a low-flying airplane. Much water is needed for rice cultivation. At right water is being pumped to irrigate a rice field in Arkansas.

withstand the colder winters farther north. In Montana, Idaho, and Washington, both winter and spring wheat crops are raised. (See maps, page 272.)

In both the spring wheat and winter wheat regions, the heaviest rainfall usually occurs during the early summer when moisture is most needed by the growing plants. Later, warm sunny days help to ripen the grain.

The size of the wheat crop in the United States depends largely on the amount of rainfall. Most wheat is grown in areas where the rainfall is less than 30 inches annually. The right amount of rainfall for producing the largest yields, however, seems to be from 30 to 35 inches.

Kansas is the leading state in the production of winter wheat, and North Dakota leads in spring wheat production. Actually, Kansas farmers often harvest about twice as much wheat as do the farmers in North Dakota. Although wheat ranks fourth in value among farm crops in the United States, it is usually the most valuable agricultural export. Much of the wheat crop is raised by modern scientific methods on large farms, some of them containing thousands of acres. Wheat is also raised by many farmers on a smaller scale, particularly in the Corn Belt and in regions of general farming. (See the map on page 269.) Wheat is the most popular

bread grain in the United States and in many other countries.

**Rice.** Although the United States annually exports a large quantity of rice, it raises less than two per cent of the world's total rice crop. Most of the world's rice is grown in warm, moist lands in southern Asia where it is the principal food of the people. So many people live in Asia, however, that several Asian countries have to import rice even though the grain is raised on most of the cropland.

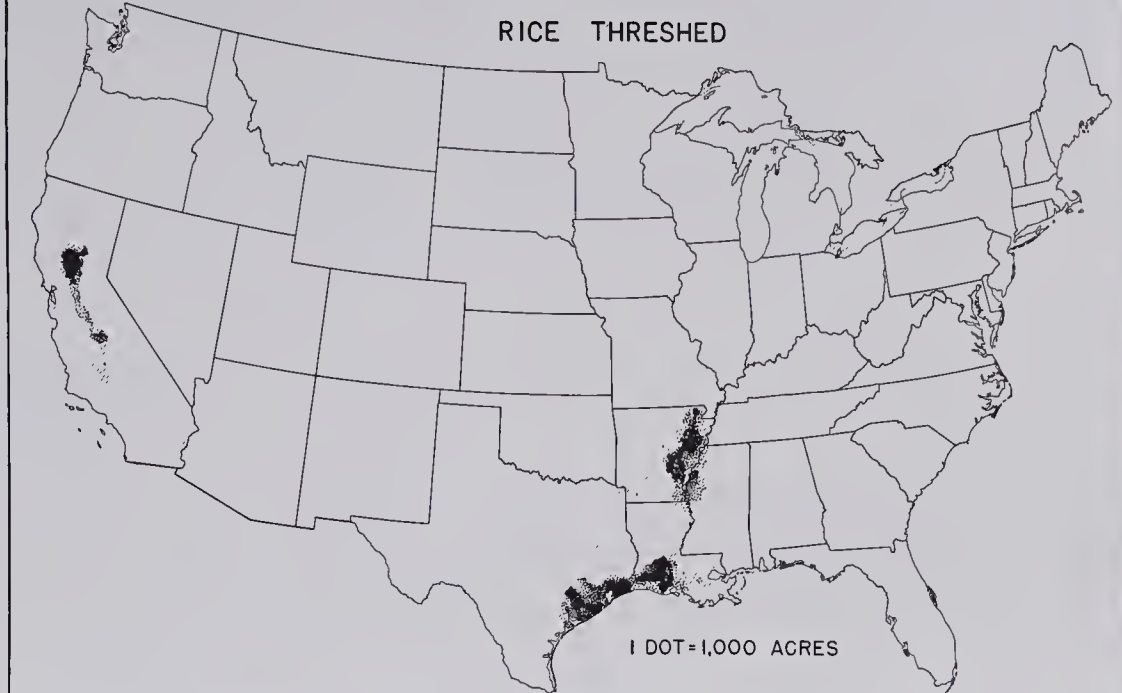
Rice is grown in a very interesting way. Rice plants require so much water that they are grown only where the land can be flooded during most of the growing period. Throughout southern Asia, most work in the rice fields is done by hand. In the United States, however, machinery

Rice is harvested when the straw-colored seed heads start to bend downward.





Compare this map with the rainfall map on page 277. Rice is usually grown in regions that have an annual rainfall of 40 to 80 inches. Is this true of the United States?



is used in cultivating and harvesting the rice. The rice is planted on very level land, and dikes are constructed to hold the water in the fields. The dikes have gently sloping sides so that machines can be driven over them at plowing and harvesting times. Many rice farmers in the United States now flood the rice fields after they are plowed and harrowed. The rice is then planted by low-flying airplanes! The use of machinery in the United States enables one man to care for 80 or more acres of growing rice. By contrast, a man in China or India where machinery is not used can care only for about two or three acres.

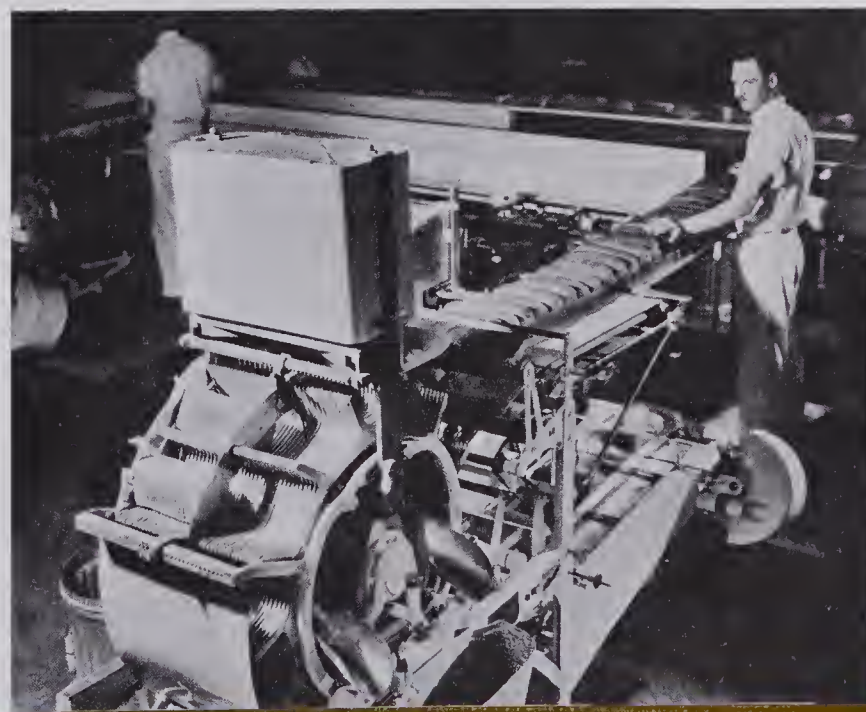
Most rice is grown in Arkansas, Texas, California, and Louisiana on land which can be irrigated easily. In the early days

of this country, before scientific agriculture, some rice was also grown on the coastal lowlands of South Carolina. (See the map at the top of this page.)

**Various Uses of Cereal Grains.** You have learned that much of the corn crop in the United States is fed to farm animals or is canned or frozen for people to eat. Large quantities of corn are ground and mixed with other grains and seeds to make chicken feed. Many products, including corn meal, starch, corn syrup, sugar, and corn oil are made from corn. The grain is also used to make alcohol, adhesives, and dextrose. Cornstalks are used in making certain kinds of wallboard and paper. Corn-cobs are used in making several products. Ground cobs can be substituted for cork, and corncobs are sometimes used as fuel.

A farmer grinds corn for his cattle. Much corn is used as feed for livestock.

This machine slices a loaf of freshly-baked bread in one operation.







Large grain elevators tower above railroad tracks. Many large elevators near the port cities of the Great Lakes have a storage capacity of 5,000,000 bushels.

About half of the wheat crop grown in the United States each year is used in making flour. To make flour, the wheat is first moistened and then ground and sifted repeatedly. The flour, in turn, is the basic ingredient in breads, cakes, cookies, macaroni, and a number of breakfast foods.

Flour mills are common in most larger cities and towns in the United States, but the largest mills are concentrated in or near the large wheat-producing regions. Almost one-seventh of all the flour produced in the nation is ground in Kansas. Major centers of flour production there include Salina, Topeka, Wichita, and Kansas City. Minneapolis, Minnesota, and Buffalo, New York, also are major flour-milling centers. Although Buffalo is a long distance from major wheat-growing areas, the wheat is easily shipped to Buffalo on the Great Lakes. Hydroelectric power from Niagara Falls is used in the flour mills there.

Another large industry using vast amounts of grain is that which prepares breakfast foods. Notice, on the boxes containing your cereal, the grains which were

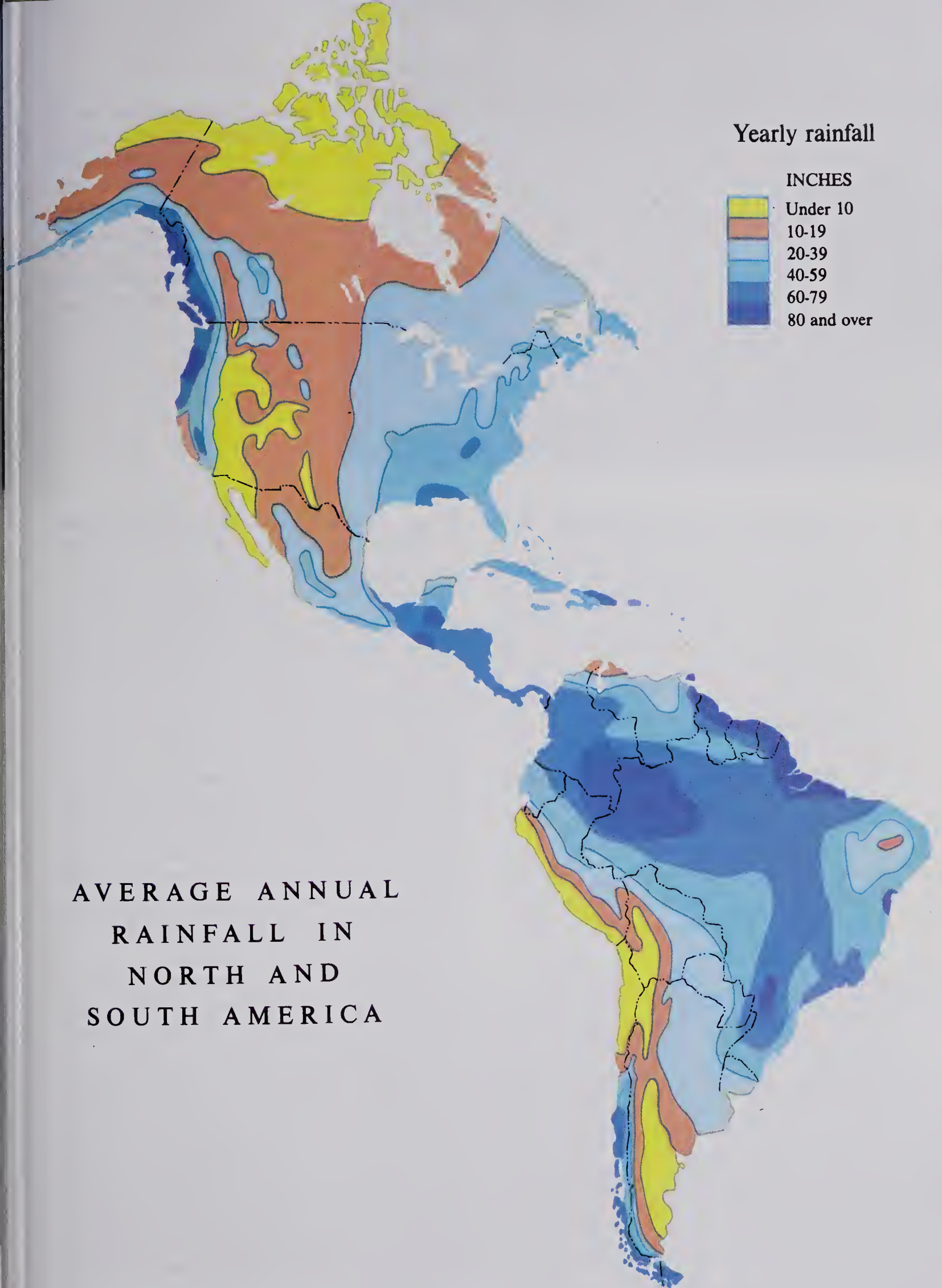
used in making it. You will find that most breakfast foods contain corn, wheat, oats, or rice. Often other grains are used. Plants which manufacture breakfast foods are concentrated mainly in Battle Creek, Michigan; Minneapolis, Minnesota; Cedar Rapids, Iowa; and Buffalo, New York.

### QUESTION BOX

39

1. What is a cereal grain?
2. What is the largest and most valuable crop raised in the United States? How is most of it used?
3. When is winter wheat planted? During what season is it harvested?
4. How much rainfall seems to be needed for producing the largest wheat yields?
5. Why is one rice farmer in the United States able to care for 80 or more acres of growing rice?
6. What are some products manufactured from wheat and corn? Where are most of them produced?





AVERAGE ANNUAL  
RAINFALL IN  
NORTH AND  
SOUTH AMERICA





This picture, taken in a market in January, shows the wide variety of fruit available in stores in the United States. Which of these fruits may have been picked long before they reached this market? Which ones may have been imported from other countries?

## FRUITS AND VEGETABLES

Raising fruits and vegetables for sale is called truck farming or market gardening. Truck farms usually are found near cities to which the product can easily be transported for sale. One of the largest truck-farming areas extends from New York City southward to Norfolk, Virginia. The many large cities located in this area create a big demand for vegetables and fruits. Truck farms on Long Island are major producers of vegetables for the New York City market. New Jersey, Maryland, and Delaware also have important truck-farming areas. The sandy soils of the Atlantic Coastal Plain are quite suitable for growing many vegetables because they heat rapidly, making the plants grow faster.

Southern states send a great many vegetables to northern markets during winter months. Areas in which fruits and vegetables are grown during the winter include Florida, Georgia, the lower Rio Grande Valley in Texas, and the Imperial Valley in southern California. Fast freight trains, with cars which can be heated during cold weather and cooled during warm weather, carry perishable products to all sections of the country. In some northern states,

lettuce, tomatoes, cucumbers, and other vegetables are grown in hothouses during the winter season. This process is expensive, however, and the vegetables must be sold for high prices. Vegetables and fruits shipped from southern states are expensive, too, but are generally less costly than produce grown in hothouses.

Many fruits and vegetables grown in the United States are sold directly to food-processing plants. The canned and frozen food industry in the United States annually processes goods worth about 2½ billion dollars. Many of the food-processing plants are rather small. Often they are located near farming areas, because the produce must be handled rapidly if it is to be of high quality when packed.

**Potatoes.** Potatoes, like corn, are native to America. They are by far the most valuable vegetable crop raised in the United States. Since potatoes generally grow best in a cool, moist climate, most of the crop is grown in the northern part of the United States. Idaho is the leading state in potato production, with Maine and California ranking second and third. (See the map on the next page.) Raising potatoes formerly was hard work. Now, almost all the labor of planting, cultivating, spraying the plants



The machine is digging potatoes in a field in Maine. Potatoes grow on the roots in "hills" or mounds of earth. This machine digs the potatoes, separates them from the roots, and cleans some of the earth from them as it moves across the field.



with insecticides, and digging the potatoes can be done by machinery.

Potatoes are a heavy, bulky crop in proportion to their value. As a rule, therefore, they are not shipped long distances because of the expense of transportation. There are a few exceptions to this rule, however. Early potatoes raised in the southern states are shipped north several months before the northern crop is ready. Also, if a region produces an exceptionally fine kind and grade of potato, it ships the potatoes long distances. Idaho, for example, ships baking potatoes to the New York City market.

Potatoes yield a much larger amount of food per acre than any of the cereals.

Wheat production in the United States averages about 25 bushels to the acre, but potato production averages about 195 bushels to the acre. Obviously, although transportation costs are high, potatoes are a profitable crop to grow in countries where there is a large demand for vegetables.

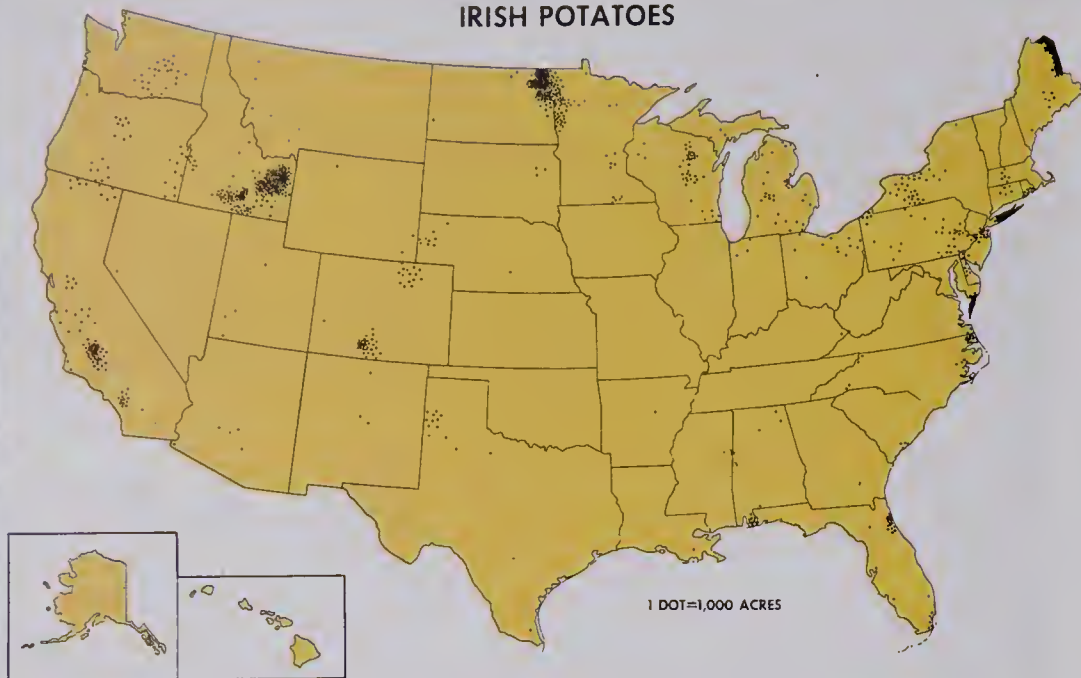
**Tomatoes.** Tomatoes are a more perishable crop than potatoes, but they can be grown almost everywhere in the United States except for Alaska. Major producing areas include California, Ohio, New Jersey, Florida, Texas, Indiana, Pennsylvania, and New York. Like corn and potatoes, the tomato is native to the Americas. Hybrid strains of tomato plants have been developed by scientists.

This boatload of tomatoes pulling away from a dock in southern New Jersey will be taken to a canning factory. Each year a large percentage of the tomato crop is sold to companies which can tomatoes and make other food products from them.

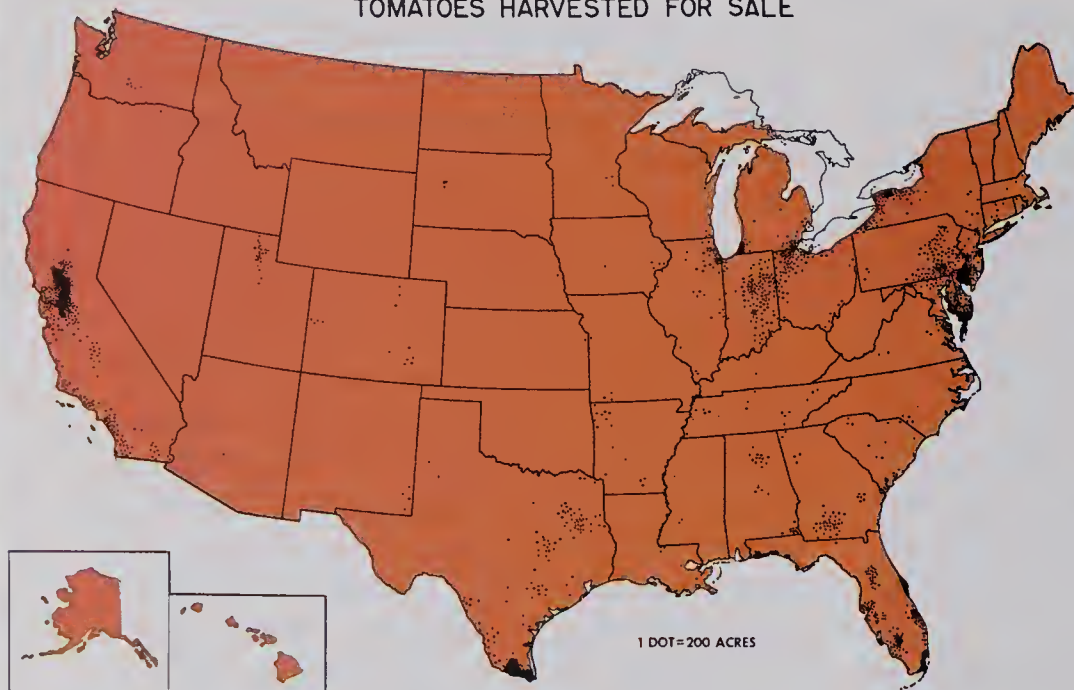




### IRISH POTATOES



### TOMATOES HARVESTED FOR SALE



### VEGETABLES HARVESTED FOR SALE



*Top.* Identify five areas on the map in which potatoes are grown in large amounts. *Center.* In many of the areas on this map tomatoes are grown in both hothouses and in open fields. *Bottom.* Compare the distribution of areas in which green vegetables are grown with that of the areas in which potatoes are grown. Can you explain why these two maps are so different? Would shipping requirements affect where some vegetables are grown?



Machinery is used as much as possible on the large truck farms in the Southwest. Here, a conveyor loads freshly-picked lettuce into the truck. The conveyor not only reduces the amount of labor needed, but it also speeds the shipment of the perishable lettuce to market.



Vast quantities of tomatoes are canned each summer as juice, soup, tomato paste, and whole tomatoes. Throughout winter months, tomatoes are sent to northern markets from the south or are raised in northern hothouses. Tomatoes are rich in vitamins A and C. Eaten fresh, they provide a welcome addition in the diet to canned and frozen foods.

Each year the tomato crop in the United States is valued at almost \$300,000,000. This is about two-thirds the value of the potato crop, yet tomatoes are the second most valuable vegetable crop.

**Other Vegetables.** In addition to potatoes and tomatoes, the most valuable vegetable crops raised include lettuce, green beans, celery, onions, cabbage, asparagus, peas, carrots, and cucumbers. Several foods which are eaten as vegetables are actually the fruits of the plants on which they grow. Tomatoes and cucumbers, for instance, are really fruits.

Some vegetables, such as leaf lettuce, radishes, peas, and spinach, grow rapidly and cannot endure severe heat. Such vegetables are raised in southern states during the winter, and in the early spring farther north. Other vegetables, such as carrots, beets, parsnips, cabbage, cauliflower, broccoli, head lettuce, and green beans grow slowly and endure the summer heat well. The vegetable growers must know the different requirements for growth of each kind of vegetable.

**Citrus Fruits.** Citrus fruits are by far the most valuable fruit crop raised in the United States, with an annual value of about 500 million dollars. Florida and California are the leading states in citrus fruit production, with Florida producing much the larger crops. Other areas in which citrus fruits are raised in the United States include southern Arizona and the Rio Grande Valley in southern Texas. (See the map on page 284.)

The way in which vegetables are marketed is an important factor in determining how quickly they will sell. These vegetables will be packaged in small plastic bags. The carrots have been washed thoroughly and are ready for cooking. Many families buy only enough of a fresh vegetable for one meal at a time.





About four-fifths of the citrus crop is oranges. The United States produces about one-third of all the oranges grown in the world. Florida and California both produce more oranges, moreover, than are grown in any other country. California and Florida oranges are shipped all over the United States and to Canada and Europe.

Oranges were introduced into Florida by the early Spanish explorers, and they have been grown there ever since. In California, growing oranges commercially was begun about 1873 when the navel orange, a seedless variety, was introduced and proved to be very successful. Navel oranges are popular for table use, but the oranges with seeds usually contain more juice. Production and consumption of oranges have greatly increased in recent years, as more people have realized their food value. Frozen concentrated juice has boosted sales, also.

**Apples.** The second most valuable fruit crop is apples. Washington and New York are the leading states in the production of apples. In Washington, apples are grown in irrigated valleys. Most of the New York apples are grown in an area just south of Lake Ontario or in the Hudson Valley. Washington apples are shipped to New York and sold in competition with the home-grown fruit. The appearance and flavor of the Washington apples are so good that the apples command a price high enough to offset the transportation costs across the continent.

Other apple-producing regions include northern Virginia, Maryland, Pennsylvania, northern New England, and the valleys of the Ozark Mountains in northwestern Arkansas and southwestern Missouri. Apples are also grown along the eastern shores of Lake Michigan, and in irrigated valleys in western Colorado, Idaho, Oregon, and central California. (Look at the map that appears on page 284.)

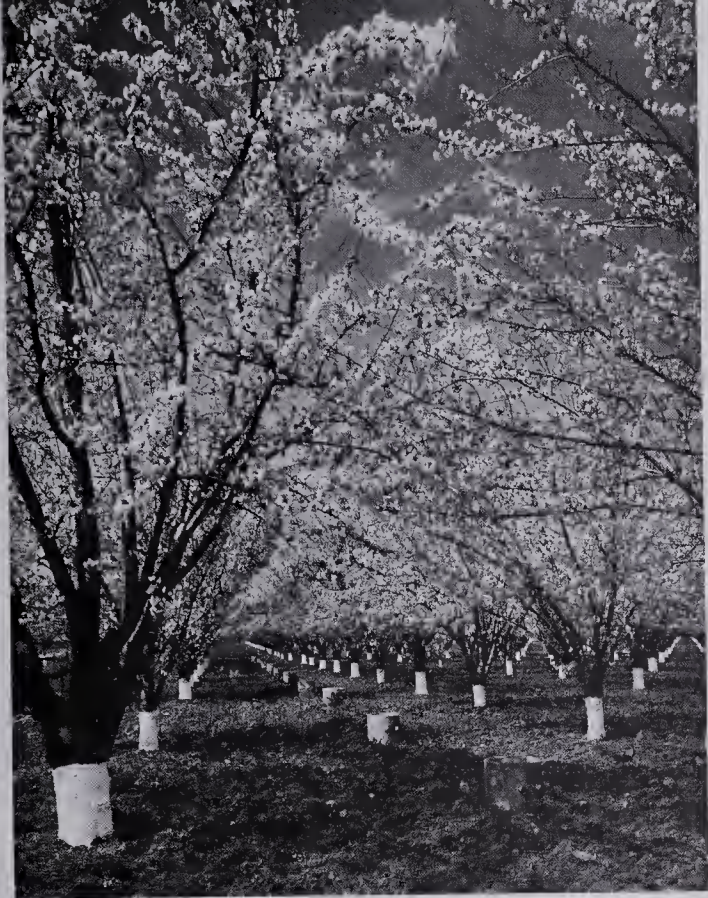
About 10,000 varieties of apples are grown in the world, and of these about 7,000 may be found in the United States. Most of these varieties, however, are not grown commercially. Apple-growers raise about eighteen varieties which the people in the United States prefer and which can be shipped without spoiling. Can you name any of these popular varieties?

**Grapes.** Grapes are the third most valuable fruit crop. Vineyards may be found all through the northeastern and east-central parts of the United States, but there are centers in which raising grapes has become a special industry. Two of these regions are in New York — one around the Finger Lakes, and the other in the southwestern corner of the state south of Lake Erie. Other important regions are in southwestern Michigan and in Washington. Grapes grown in these regions are eaten fresh or made into grape juice or wine.

California is the great leader in the grape industry, producing over three-fourths of all the grapes grown in the United States. Farmers in California grow about 50 times as many tons of grapes as do farmers in Washington and Michigan. California also exceeds New York in grape production by about 25 times. The annual crop of grapes in California each year is almost three million tons. Many of the grapes grown in California are dried into raisins, which can be easily shipped all over the country. Large quantities of fresh grapes are also shipped to supermarkets and grocery stores all over the nation. Much of the crop is used for making wine.

**Peaches.** Peaches are another valuable and popular fruit widely grown in the United States. Peach trees are more sensitive to both cold and warm weather than are apple trees. During a warm spell in the early spring, peach trees are likely to start budding. If the warm spell continues, the trees will begin to blossom before





*Above right.* Ripe Hawaiian pineapples are placed on a conveyor belt, which carries them to a fruit bin on the truck. The bin will then be transported to a pineapple cannery. *Above left.* The cement cylinders between the rows of cherry trees are the exposed parts of the underground irrigating system for this orchard. *Left.* California grapes are shown being loaded into a refrigerated car. Much fresh fruit is shipped to markets in such cars. *Below.* Every year, new cherry trees are planted in this Colorado orchard. The trees on the right side of the picture are five years old, and those on the left side of the picture are two years old.



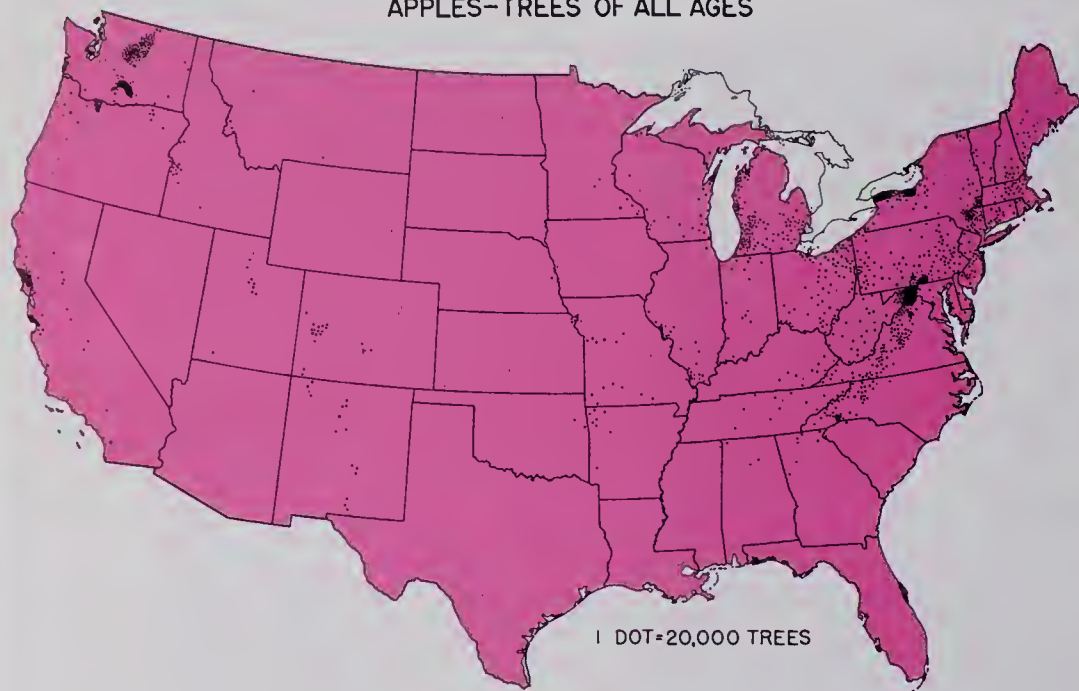


# ORANGES - TREES OF ALL AGES



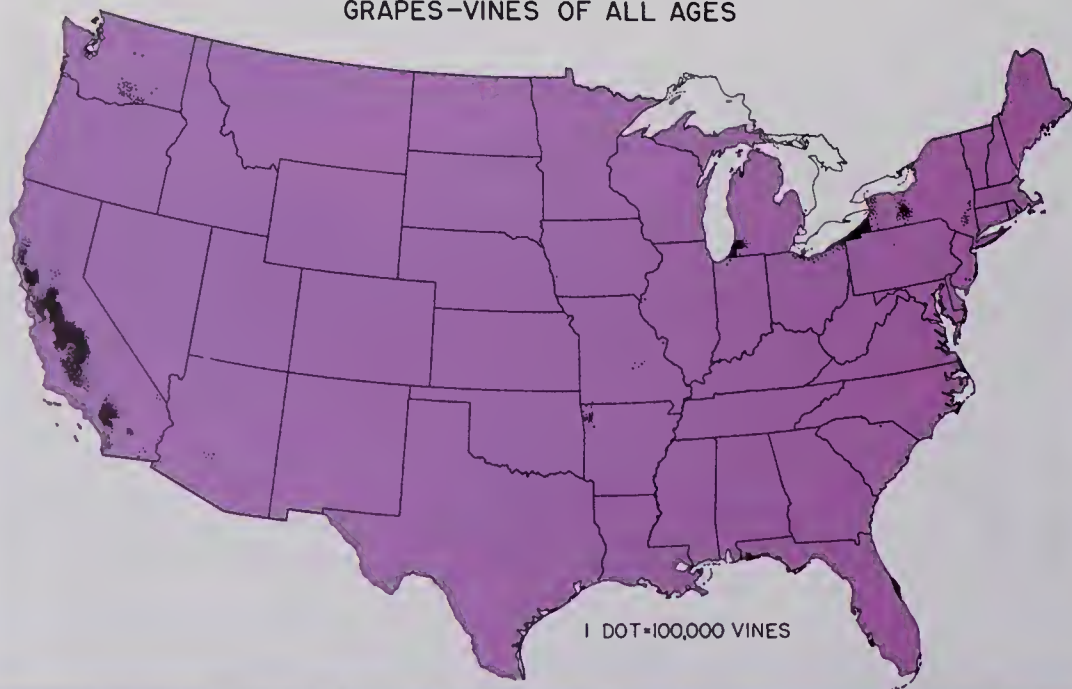
*Left.* Note that oranges are grown in only a few states. *Above.* These oranges are ready to be processed. How long a growing season do most citrus fruits need? (See the chart on page 270.)

# APPLES-TREES OF ALL AGES



*Left.* Note that most apple trees are grown in areas that are fairly well watered. *Above.* To avoid bruising and spoilage while in storage, these apples are picked from the tree by hand.

# GRAPES-VINES OF ALL AGES



Compare the three maps on this page. Are most citrus fruits grown in southern areas? *Below.* Grapes must be harvested quickly when they have ripened so that they do not spoil on the vine.







*Top.* An orange grove is being sprayed with an insecticide. *Center.* This apple orchard is located near a large lake. *Bottom.* A farmer in California's Central Valley cultivates a freshly-pruned vineyard.



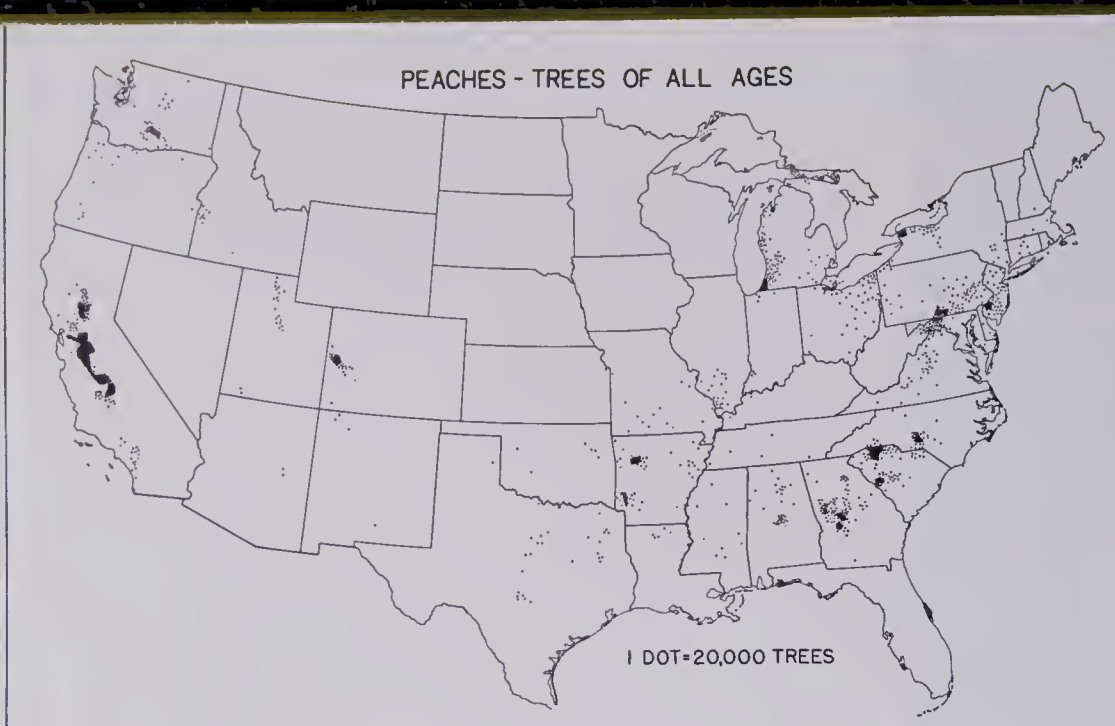
all the killing frosts are over. As you can see, the peach crop is very dependent upon the spring weather, especially in northern states. Most peaches are raised in areas a little south of the apple-growing regions. Peaches are grown in many areas of the country, but about half the entire crop each year is raised in California. Among the major peach-growing states are South Carolina, Georgia, Pennsylvania, Michigan, New Jersey, and Washington. Large crops of peaches are also raised in New York, Arkansas, North Carolina, Virginia, and Colorado. Georgia and South Carolina provide early peaches for the northern markets. The very large peach crop in California is mainly canned, frozen, or dried for sale. Only a few of the California peaches are shipped to other states as fresh fruit.

**Other Fruits.** Pears, plums, cherries, apricots, and many other kinds of small fruits and berries are raised abundantly in the United States. These fruits are grown mostly in the major fruit-producing regions of the northeast and in the Pacific States, but small orchards are located all over the nation. Cranberries, a traditional fruit at Thanksgiving time, are grown mainly on Cape Cod in Massachusetts. Pears, plums, and apricots are raised especially in California and the other Pacific States. Most of these fruits are either dried or canned, but some are shipped fresh to markets across the land.

**Dried-Fruit Industry.** Drying is one of the oldest known ways of preserving fruits. Many years ago, strings of apples, hung up in the kitchens and around open fireplaces, were a common sight. Peaches, pears, and different kinds of berries were also dried and kept for winter use long before food canning was practiced.

The fruits now dried to be sold include apricots, plums (prunes), and grapes (raisins). Surplus apples and other fruits also



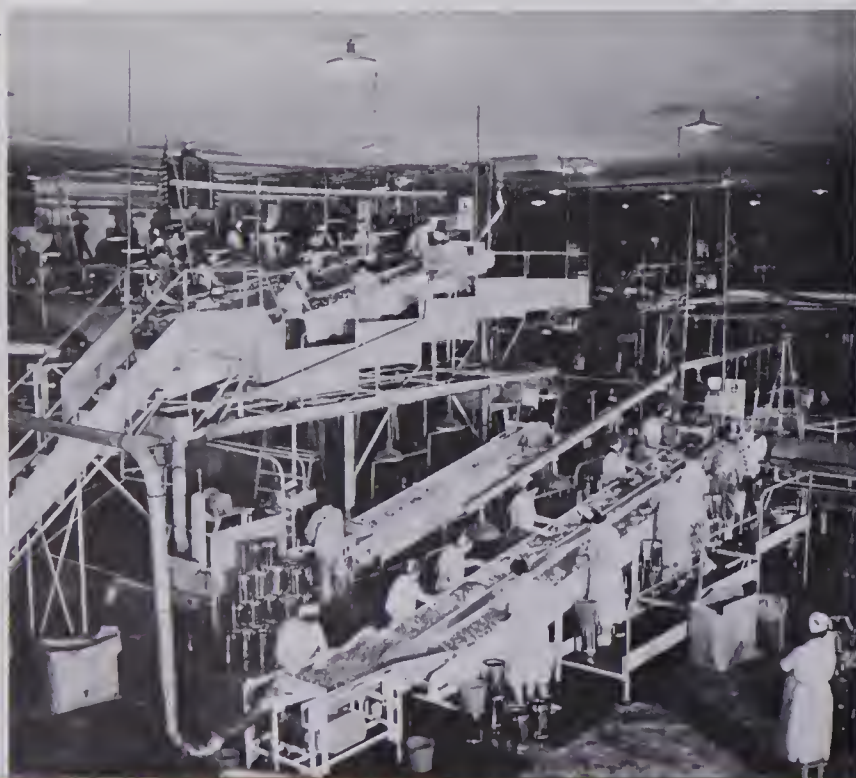


Most peach orchards are located in areas that are not likely to have a killing frost after the blossoms begin to appear in the spring.

are dried, but they are not generally grown for this purpose.

Most of the dried fruit produced in the United States comes from California. Almost all of the raisins and apricots and the greater part of the prunes and apples are grown and dried there. Many prunes and dried apples are also packaged in Oregon and Washington. One of the reasons for the importance of the Pacific States in the dried-fruit industry is the climate in that region. The fruit can be dried in the open during the dry, sunny summers. The dry air causes the fruit to dry quickly, and it

As the strawberries pass along the lines, workers grade them according to size and quality. This picture was taken at a packing plant in Santa Clara, California.



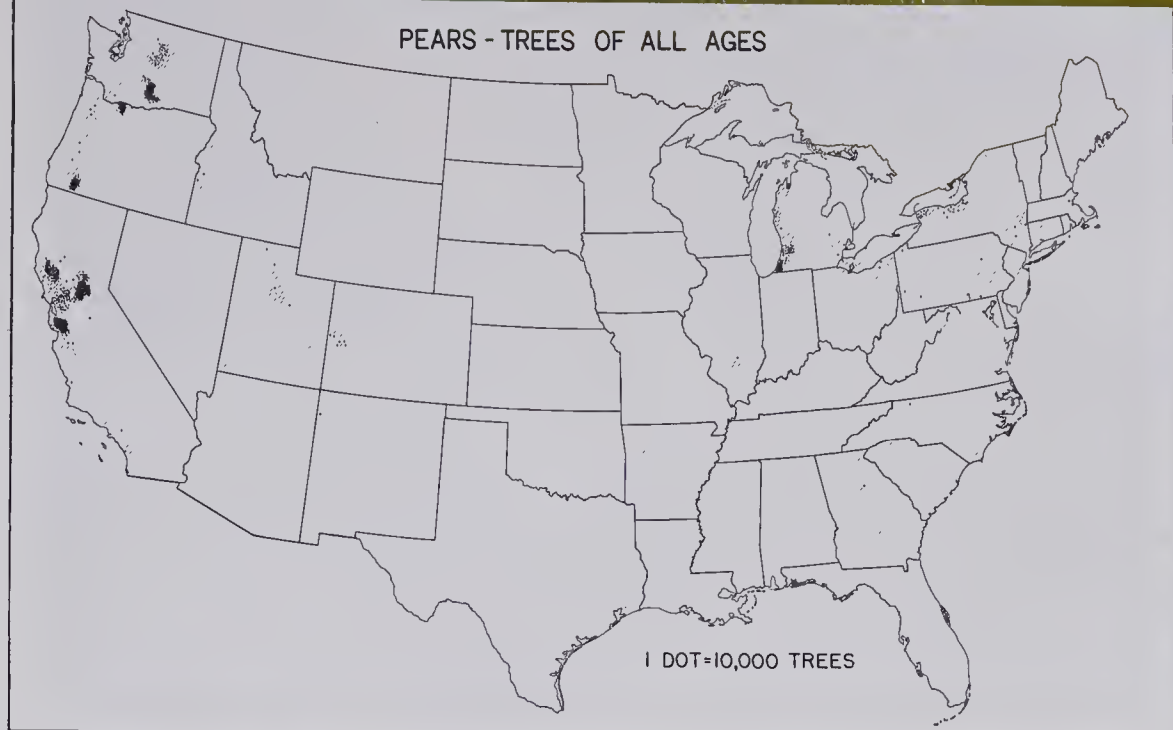
is lighter in color and has better flavor than fruit dried in more humid areas. Fruit dried on eastern farms, by contrast, is darker in color. Though it may taste just as good, it is not as attractive in appearance and does not sell as well as the light-colored, dried fruits of the West.

**Canning of Fruits and Vegetables.** A method of preserving fruits and vegetables in glass jars was not discovered until late in the 18th century. Preserving foods in tin cans did not become general practice until after the middle of the 19th century. Today, canning factories are located all over the country and almost all kinds of vegetables and fruits are canned. Fruits and vegetables — which are canned in great abundance — include tomatoes, corn, peas, beans, peaches, apples, pears, and pineapple.

More food is canned in California than in any other state. Almost all kinds of fruit and vegetables are grown under irrigation and processed in California. Other areas are especially known for particular products, however. Oregon and Washington lead in the production of canned berries, Hawaii leads in canning pineapple, and Florida leads in canning citrus fruits and juices. Wisconsin produces large quantities of canned peas. In northern states, beans, corn, pumpkin, peas, beets, applesauce, and



Notice that although pears are grown in many areas in which peaches are also grown, the production of pears is less than that of peaches.



berries are canned. In many southern states sweet potatoes are a major canned product.

One of the largest centers of the canning industry in the United States, besides California, is located on the coastal plain south of New York City. There, in New Jersey, Maryland, Delaware, Virginia, and North Carolina, large quantities of tomatoes, corn, peas, string beans, other vegetables, and berries are canned.

**Frozen Fruits and Vegetables.** The latest method developed to preserve fruits and vegetables is freezing. Frozen-food plants are located in the regions where fruits and vegetables are grown, so that the food can be processed quickly. As soon as possible after they are picked, the fruits



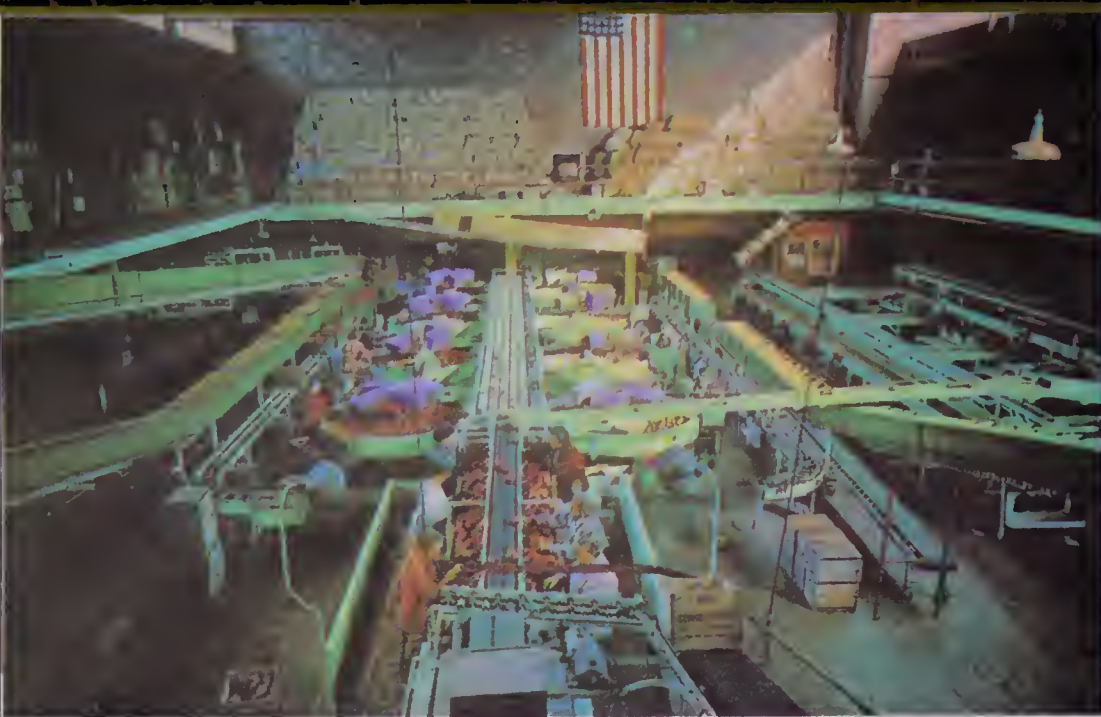
Pineapples are fed into a machine which removes the shell and core before they are cut in pieces and canned.



*Above.* Apricots spread out on flats dry quickly in the sun. *Below.* Peas are packaged and frozen several hours after picking.







Thousands of bushels of apples are packed in this plant in West Virginia. If packed so they are not bruised, they can be stored for long periods in refrigerated storage plants.

and vegetables are cleaned carefully and packed. Then they are placed in freezers where low temperatures freeze them quickly. Rapid handling helps to preserve the quality and fresh flavor of the food. Many fruits and vegetables are now available in frozen form.

**Distributing Food.** Food distribution is the biggest industry in the United States. More than \$65 billion was spent in a recent year by Americans for food. Almost three-fourths of this vast sum was spent in supermarkets. This American invention has now spread throughout the world. In the U.S.A. the supermarket has helped lower the cost of food distribution from about one-fourth of the basic cost to about one-sixth of it.

#### QUESTION BOX

40

1. Why are truck farms usually located near cities?
2. Why are most food-processing plants located near farming areas?
3. What are the three most valuable fruit crops grown in the United States?
4. What are the major ways of processing food for human consumption? (Give examples of each process.)

#### COTTON

Cotton is the most valuable money crop raised in the United States. The corn crop considerably exceeds the cotton crop in value, but much of the corn is raised to be used as feed on the farms where it is grown. Cotton is raised to be sold. More than one-fourth of the world's supply of cotton is raised in the United States, and this crop usually is worth almost two and one-half billion dollars!

No other product has played such an important part in the history of the United States, and particularly in the history of one region — the South. Years ago, most farmers in the Cotton Belt planted little except cotton on their land. It became the leading crop of that region, and was called "King Cotton" because of its importance. The need for cheap labor in the cotton fields of the southern plantations was largely responsible for the use of Negroes as slaves until the Civil War. Moreover, the prosperity of the southern states until recently was largely dependent on the cotton crop.

The region in which cotton is grown has gradually spread westward, with Texas now producing almost a third of the annual crop. The westward spread of the cotton-growing region has not stopped in



Texas, however. Cotton is now grown under irrigation in New Mexico, Arizona, and California, with California now leading all the southern states east of Texas in production. Other important cotton-producing states are Mississippi, Arkansas, Alabama, and Tennessee. A considerable amount of cotton is still grown in Georgia, Louisiana, Missouri, and the Carolinas, too.

Until recent years, much of the work in the cotton fields had to be done by hand. Then seeders, cultivators, and mechanical cotton pickers were developed. Quite a bit of the cotton crop still is harvested by hand, however, in order to obtain a higher grade of cotton. Machines mix more leaves and stems in the cotton and also, of course, cannot select the bolls of cotton which are ready for harvesting!

**Growing Conditions.** The cotton plant requires at least 200 frost-free days in which to grow and ripen. In the Cotton Belt, considerable rain falls during spring and summer months. By contrast, little rain occurs in the autumn when the cotton crop must be harvested. (See the maps on pages 198 and 269.) Days are hot and nights are quite warm for several months in this region, providing almost ideal conditions for growing cotton. Even better conditions are found, however, in the southern part of the Central Valley in California, and in southern Arizona and New

Mexico. In these regions, farmers can irrigate the cotton when the plants need water instead of relying on rainfall.

Cotton should not be grown in the same fields year after year. When this is done, elements such as nitrogen, potash, and phosphorus needed for good plant growth are used up and the yield of cotton decreases. Large amounts of fertilizer containing these plant foods must be used by cotton growers in order to maintain the fertility of the soil.

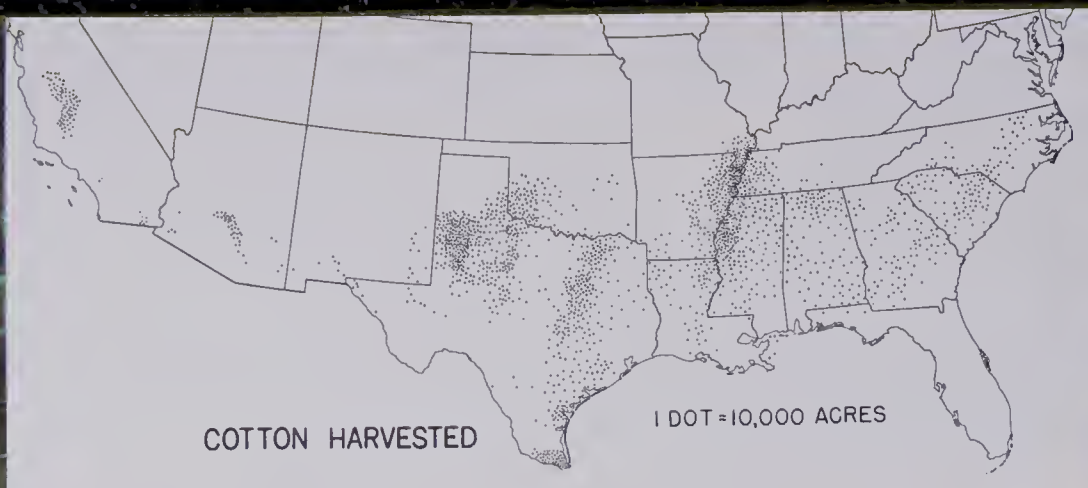
The cotton crop must be sprayed, also, to destroy an insect pest called the boll weevil. Spraying is often done by low-flying airplanes. The boll weevil probably was more responsible for changing agricultural practices in the South than any other factor. This pest first entered the United States from Mexico in 1892, and has now spread over most of the Cotton Belt. Often, it has caused the loss of almost half the crop in the infected areas. The weevil lays its eggs in the young cotton boll. When the eggs are hatched, the young insects feed upon the boll, destroying its growth and causing it to rot or dry up and fall off. Although much has been done to destroy the boll weevil, complete destruction of this pest has not yet been achieved.

**Varieties of Cotton.** Only a few varieties of cotton are now being raised, in contrast to the many different varieties which were

Cotton plants require care all during the growing season. They are frequently sprayed with a preparation that is both an insecticide and a weed killer. Some cotton growers now use airplanes to spray the plants.







The map shows where the major cotton-growing areas in the United States are located. Mechanical cotton pickers are used on this large plantation.

once grown. When textile manufacturers complained of the differences in length and quality of the cotton, farmers began to standardize their product. Today, most farmers plant the kind that has been tested and proved to grow best in their area. California has a law prohibiting growers from raising any variety except the one which has been found most satisfactory there.

**The Cotton Textile Industry.** Before the invention of textile machinery, cotton goods were expensive and scarce. The invention of spinning and weaving machines that could be run by water or steam power did much to lower the cost of cotton goods. The invention of the cotton gin, which rapidly separated the seeds from cotton fibers, also lowered the price of the raw cotton.

By the time the United States had gained its independence, England had developed cotton textile machines. To protect its industries, however, the English refused to

allow any textile machines to be shipped from the country. Finally, an English mechanic named Samuel Slater came to America, "bringing a machine in his head." He built a crude machine and started a cotton mill in Rhode Island in 1790. This mill was the beginning of the cotton textile industry in the United States. Twenty years after Slater built his first mill, there were more than 60 cotton mills in New England and others were under construction.

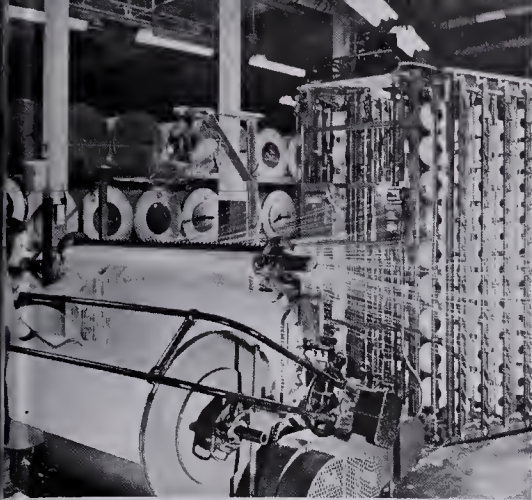
For many years, New England was the chief center of the cotton textile industry. In recent years, however, the industry has grown in the South and has declined in importance in New England. This has happened principally because manufacturing costs, especially transportation and labor, are lower in the South. The mills are located along streams as they were in New England. The leading states in manufacturing cotton textiles today are North Carolina, South Carolina, Georgia, Alabama, and Massachusetts. More than nine-tenths of the cotton yarn or thread which is later woven into cloth is now processed in cotton-growing states.

Cotton manufacturing is the leading textile industry in the United States. More than three-fourths of all the cloth woven each year is made from cotton fibers. Cotton cloth is principally used by people living in the United States for several reasons. First, an enormous supply of cotton is available for use. Second, climates in the

Wagons piled high with freshly-picked cotton wait outside a ginning mill.

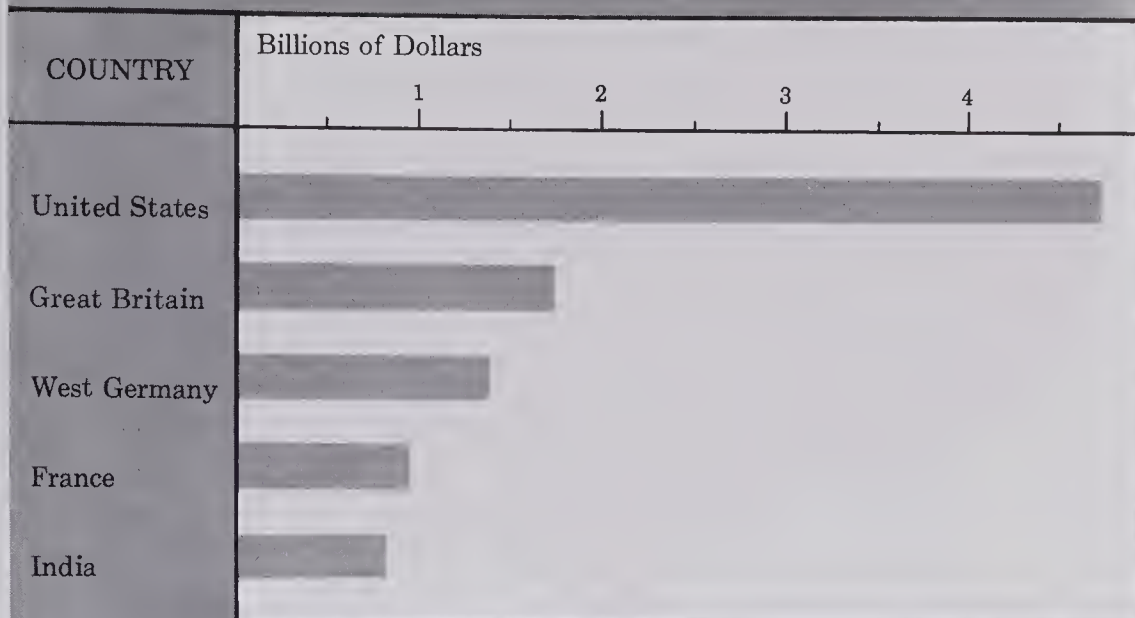






The machine winds yarn on spools which are used in power looms. The quality of the fiber and the weaving methods affect the value of the textile produced.

## FIVE LEADING TEXTILE PRODUCING COUNTRIES\*



\*Excluding the U.S.S.R. and China for which statistics are not available.

United States are such that cotton clothing is comfortable to wear. Third, cotton cloth wears well, and washes and irons easily. In addition to clothing, many other products such as curtains, carpets, sheets, pillowcases, tablecloths, napkins, and towels are made from cotton fibers.

**By-Products of Cotton Manufacturing.** About two-thirds of the weight of newly-picked cotton is in seed. Finding a use for cotton seeds was a problem until someone discovered that the crushed seed made an excellent fertilizer. Other uses were then discovered, and now many valuable products are made from cottonseed.

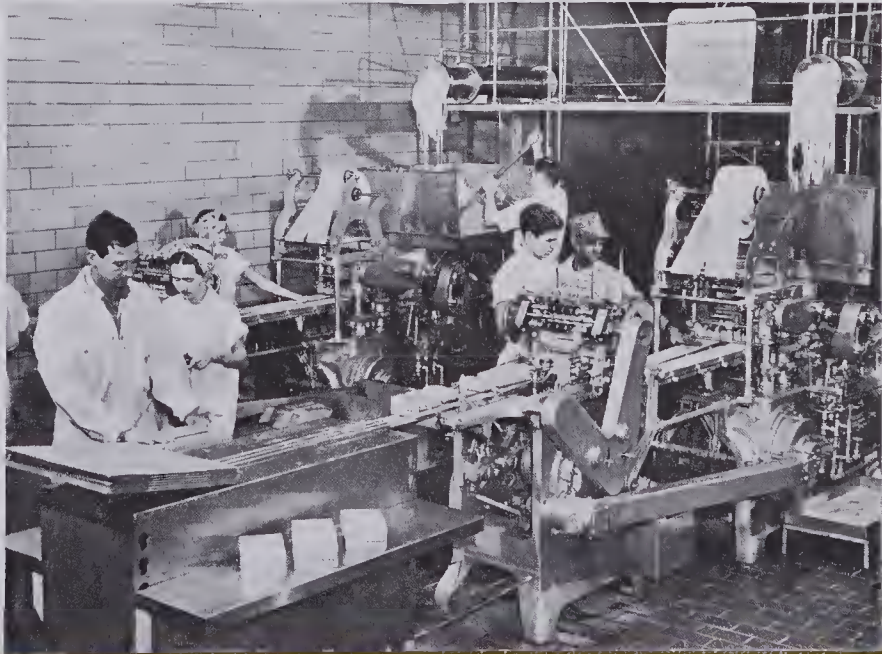
The four main products derived from cottonseed are linters, hulls, oil, and cake or meal. Linters are the very short fibers

that cling to the cottonseed after ginning. Linters are used for a variety of purposes, including stuffing material for cushions, mattresses, and upholstery. They also are used in absorbent cotton, felt, lampwicks and candlewicks, twine, rope, writing paper, plastics, paper, varnishes, rayon, and photographic film.

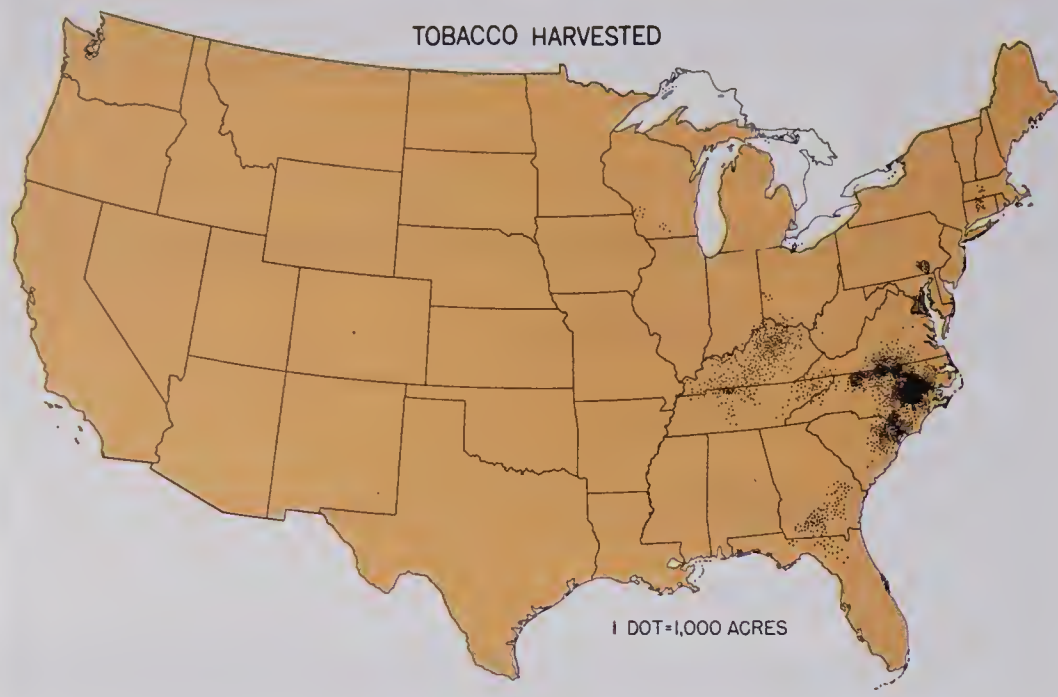
After linters have been removed, the hulls are separated from the seeds and the seeds are pressed to obtain cottonseed oil. Refined cottonseed oil is used mainly in making margarine and shortening. After the oil has been pressed from the seeds, the hulls and cake are left. When ground, the cake forms cottonseed meal which is used for cattle feed and in making fertilizers. The hulls are used in similar ways.

Muslin, an inexpensive cotton material, is used for patterns in clothing factories.

Cottonseed oil is used in making oleomargarine at this factory in Arkansas.







Can you locate the areas in which each of the five types of tobacco discussed in the text (the next page) are grown?

## TOBACCO

Tobacco was raised and used by the American Indians before European colonization began. The early settlers soon learned to raise tobacco for themselves, and explorers took it back to Europe where its use spread rapidly. The demand for tobacco caused it to become an important money crop in Virginia. There was a demand for many other crops which also could have been raised in Virginia. The colonists, however, needed to have a crop that could be traded for products which they could not produce themselves. Tobacco served this need.

**Raising Tobacco.** Today, tobacco-growing has spread to many states and is an important crop in thirteen states. Farmers in North Carolina, Kentucky, South Carolina, Virginia, Tennessee, Georgia, and Pennsylvania plant most of the tobacco grown in the United States. When compared to acreages planted in corn and wheat, not much land is planted in tobacco. For instance, North Carolina, the major tobacco-producing state, has three times more land planted in corn than in tobacco. Kentucky, second to North Carolina in tobacco production, has more than six times as many acres in corn as in tobacco. The total value of the tobacco crop in the United States



*Left.* Tobacco plants must be handled gently when they are transplanted from the seed-beds to the fields. *Below.* Young plants are sprayed to control insect pests. They are also inspected and trimmed by hand.





is annually only about one-fourth the value of the corn crop. For each acre of tobacco harvested, however, farmers' income in a recent year was about eighteen times more than it would have been for an acre planted in corn.

The main reason why tobacco acreages are small and income is high is that both growing and curing tobacco require a great deal of hand labor. The young plants have to be carefully transferred from a seedbed to the open field. Then, they must be carefully cultivated and inspected for worms which destroy the leaves. Shoots from the main stalk must be broken off so that the plant's strength will go into large, thick leaves. In the early autumn, the tobacco must be harvested by hand. Leaves must be carefully stripped from the stalk. If the leaves are broken, the tobacco will bring a lower price at the market.

If the tobacco is to be of a high grade, **curing** or drying the tobacco must be carefully done, also. Tobacco may be flue-cured, fire-cured, or air-cured. In flue-curing, the tobacco is placed in a tightly closed barn and dried by heat carried into it through flues which extend under the hanging tobacco. In fire-curing, tobacco is dried in the smoke of an open wood fire. Air-cured tobacco is hung inside a building and simply dried in the air without the use of artificial heat.

The quality of tobacco is very dependent on the kind of soil and the climate in which it is raised. Tobacco soon exhausts certain necessary elements in soils unless fertilizers are added. In the early days of the tobacco industry in the United States, new land was plentiful. When the tobacco growers found their yields decreasing, they simply abandoned the old fields and moved to new ones with fertile soil. Today, rotation of crops is practiced by most tobacco farmers and large amounts of fertilizer are applied to the fields to maintain fertility.

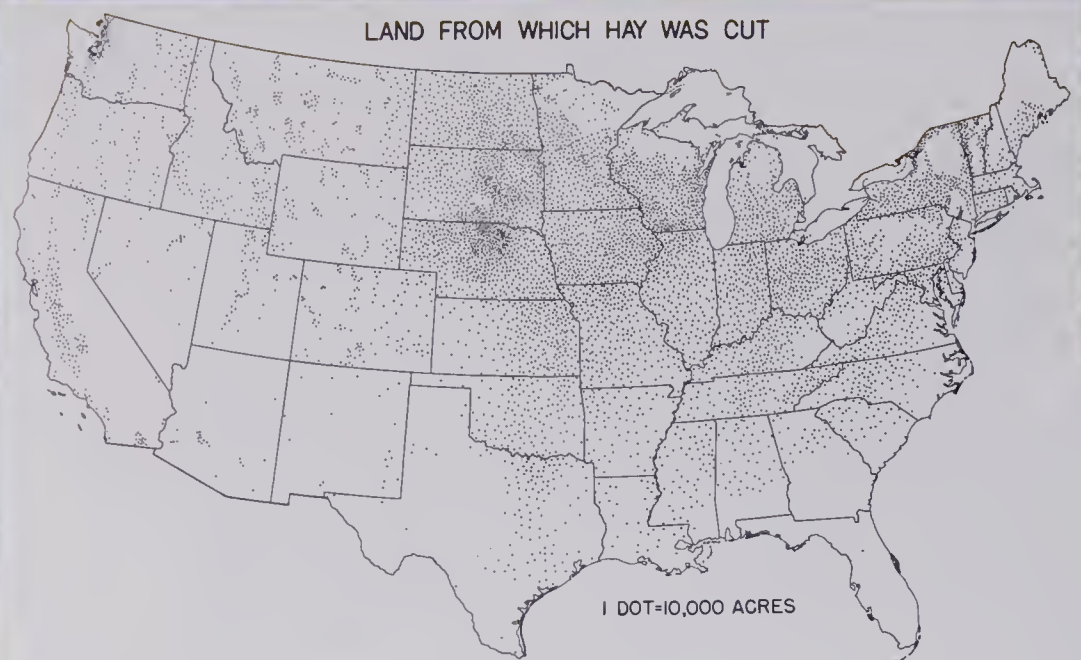
**Tobacco Products.** Tobacco is used in a number of ways. Much of the annual crop in the United States is made into cigars and cigarettes. Tobacco may be shredded to make pipe tobacco, or it may be sweetened and pressed into a solid cake known as "chewing plug." Some tobacco is powdered and used as snuff. Cigars are made largely by hand, while cigarettes are made almost entirely by machines. Factories in North Carolina, Virginia, and Kentucky produce most of the cigarettes made in the United States.

Different types of tobacco are grown in different parts of the country and are used for different purposes. Tobacco used especially for cigar wrappers is grown in the Connecticut Valley, in Wisconsin, and in northern Florida. Tobacco used for filling cigars is a specialty crop in southeastern Pennsylvania and southwestern Ohio. Tobacco used in cigars is always air-cured. Burley tobacco, which is used in cigarettes, is grown in western Kentucky and Tennessee and is mainly air-cured. Dark, fire-cured tobacco grown in Virginia and Kentucky is used for chewing plug and snuff. Bright, flue-cured tobacco, grown especially in North Carolina, South Carolina, and Georgia, is in demand for the manufacture of smoking tobacco and cigarettes.

The United States not only grows and exports more tobacco than any other country, but it also consumes more. The average yearly consumption of tobacco per person over 15 years old in the United States is now about eleven pounds.

In 1964, the Surgeon General of the United States released the findings of a distinguished panel of doctors whom he had asked to examine the relationship between smoking and cancer. The doctors indicated that smoking was a major cause of lung and larynx cancer. According to the doctors, cigarette smokers were more likely to get these cancers than pipe and cigar smokers.





Notice that hay is cut in areas widely distributed throughout the country. *Above.* On many farms, mechanical balers can do the work of a number of men in a short time.

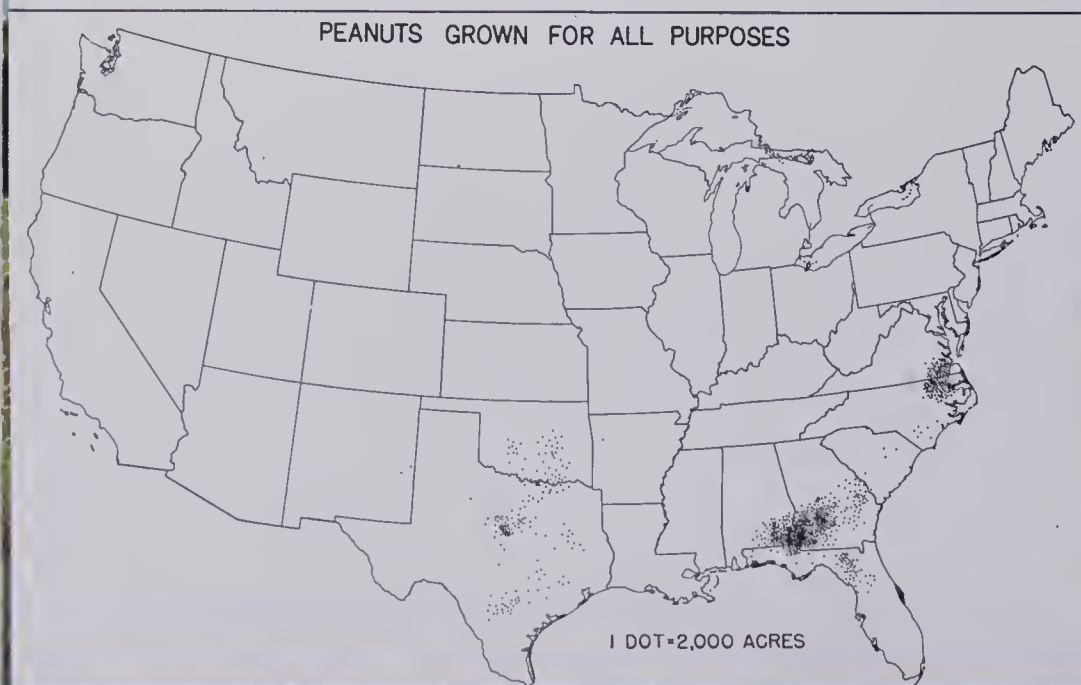
## OTHER IMPORTANT CROPS

**Hay.** Many farmers in the United States grow a number of valuable crops in addition to the ones which have been discussed. The most valuable of all crops except corn is hay. Like corn, hay is used principally as feed for livestock. The hay crop in the United States each year is worth about two-thirds of the corn crop. Usually, farmers produce various kinds of hay worth about two and one-half billion dollars.

**Soybeans.** Another major crop is soybeans, which are used as food for people and livestock, and in industry. Much soybean oil is used in making shortening and margarine. After the oil has been pressed from the bean, the hulls and the pulp are made into soybean meal which is used in the plastics industry. Some soybean flour is mixed with other flours in cake mixes

and breakfast foods. Soybeans are raised by many farmers to enrich the soil, because the plant is of the legume family. Plants of this family have **nitrogen-fixing** qualities. Bacteria which grow around their roots "fix" or transfer the element nitrogen from the air into the soil. Many farmers store the harvested soybean plants in silos and feed them to livestock. The main center for soybean production is the Corn Belt.

**Oil-Bearing Seeds.** Several oil-bearing crops, other than those already discussed, are important money producers for farmers in the United States. Two of the most important of these crops are flax and peanuts. The United States produces annually about one-fourth of the world's supply of flaxseed. The seed is used in manufacturing linseed oil, a necessary ingredient in high-quality paints. The flax stalks are used in making cigarette paper and flax



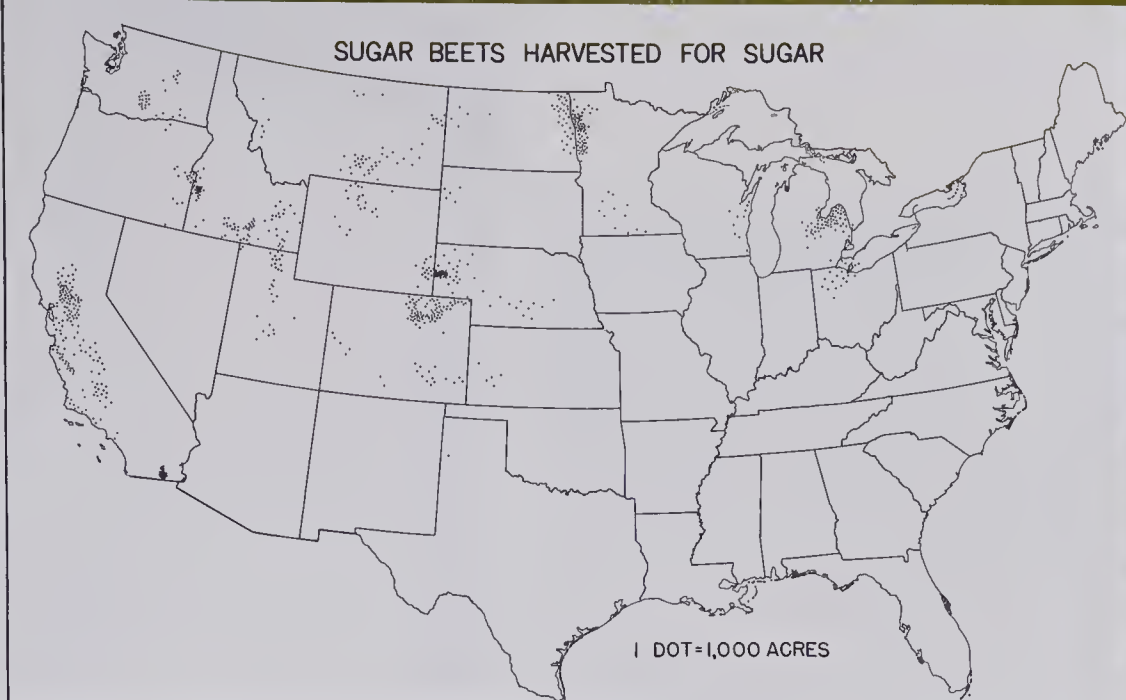
There are several varieties of peanuts grown in the areas shown on the map. *Below.* Peanuts, which actually are seeds, grow in pods attached to the roots of the plant.







Sugar beets are being unloaded at a boat landing on the Sacramento River. About one-third of the sugar consumed in the United States comes from sugar beets.



fiber from which linen is woven. North Dakota, Minnesota, and South Dakota are the main flax-producing areas.

Peanuts are grown in many areas of the world because of their high food value. The peanut is one of the favorite nuts of people in the United States. Many peanuts are not used as food, however, but are pressed to obtain peanut oil which has many uses in industry. The solids which are left after the oil has been removed are used in feed for livestock and in making a number of manufactured products. Peanut vines, hulls, and skins are also used as livestock feed. Main centers of peanut production in the United States are southern states, including Georgia, North Carolina, Virginia, Alabama, and Texas.

**Sugar.** Sugar is an energy food which plays a very important part in a person's diet. The people of the United States eat more sugar per person, about 99 pounds annually, than the people of any other country.

Although both sugar cane and sugar beets are grown in the United States, production of sugar does not nearly meet the demand. Large amounts of raw cane sugar are imported each year, mainly from Puerto Rico and the Republic of the Philippines. Until recently, much of the sugar used in the United States came

from Cuba, the world's largest sugar-producing country. At the time this book was written, however, all imports from Cuba had been stopped. Do you remember why? More money is spent for imported sugar than for any other agricultural import, except for a group of products including cocoa, coffee, tea, and spices, and for meat.

As has been mentioned, both beet sugar and cane sugar are produced in the United States. Leading states in raising sugar cane are Hawaii, Louisiana, and Florida. Much cane is also grown in the Commonwealth of Puerto Rico. At sugar mills, where raw sugar is made, the cane is washed, shredded, and crushed. Then the sweet juice is washed from the crushed stalks. The fibers that are left, known as **bagasse**, are used to make paper, wallboard, acoustical ceiling tile, and other products. Cane sugar usually is imported as raw sugar or as

A machine is used to load the sugar cane onto flat cars in this field in Hawaii.





molasses. Refineries, usually located in or near seaports, then make the pure sugar we buy at grocery stores.

More sugar is obtained from sugar beets raised in the United States than from the cane raised in the country. Sugar beets are grown in many northern and western states where the growing season is at least five months in length. During the growing season, sugar beets need fertile soil and moderately warm temperatures with long hours of daylight. Sugar beets usually are grown where the land can be irrigated in California, Colorado, Idaho, Washington, Nebraska, and other western states. States bordering on the Great Lakes, particularly Michigan and Minnesota, produce large quantities of sugar beets on non-irrigated land. These areas usually have sufficient rainfall during the summer months for the beets to grow well.

As sugar beets are heavy to transport, beet-sugar factories are built near producing areas. At the factories, the beets are cut into small pieces and soaked in hot water to remove the sugar. The pulp that is left is used as cattle feed.

## ANIMAL HUSBANDRY AND RELATED INDUSTRIES

Animal husbandry is the science of producing livestock, and includes breeding, raising, and marketing the animals. Animal husbandry has been an industry for thousands of years, on both a subsistence basis and a commercial basis.

You may be surprised to learn that the greater part of the cultivated land in the United States is used to support farm animals. Most of the corn and oats crops, about one-half of the barley crop, and some of the wheat and rye raised in the United States are fed to animals. In addition, millions of acres of land are used to raise other food crops consumed almost exclusively by animals. Among these crops are alfalfa, clover, cow peas, sorghum (a plant somewhat like corn), and grasses of different kinds which are dried for hay. Peanut vines and soybean stalks are also used as feed for animals, as you have learned.

**Cattle.** Cattle furnish the people of the United States two of their favorite foods, milk and beef. Certain breeds of cattle are best for furnishing beef and others are best for furnishing milk. The United States has more cattle than any other country except India. In India, however, very few cattle are killed and used for meat. In the United States, by contrast, about 27,000,000 cattle are slaughtered each year. Only about one-fifth of the cattle on farms and ranches in the United States are dairy cattle. Nevertheless, part of our beef supply comes from dairy cattle which, after furnishing milk for a number of years, are killed to provide meat.

More than one-third of the beef cattle in the United States are raised in the North Central States. Large numbers of beef cattle are raised also in Texas, Montana, and other western states. Beef cattle raised in

### QUESTION BOX

41

1. What is the most valuable money crop grown in the United States?
2. What climatic conditions are best for growing cotton? Why should farmers avoid planting cotton in the same field every year?
3. How did the cotton textile industry get its start in the United States?
4. What are some products that are made from cottonseed?
5. What are three ways in which tobacco is cured?
6. What is "bagasse"? How is it used in industry?





*Above.* Many farmers throughout the United States keep small flocks of sheep on their land. *Left.* The new type of turkeys which have been developed by breeders have helped this industry to grow rapidly. The birds are smaller and are of a more convenient size for storage or cooking purposes than are large turkeys. *Right.* Modern hog farmers feed their hogs in clean pens with hard, dry floors.

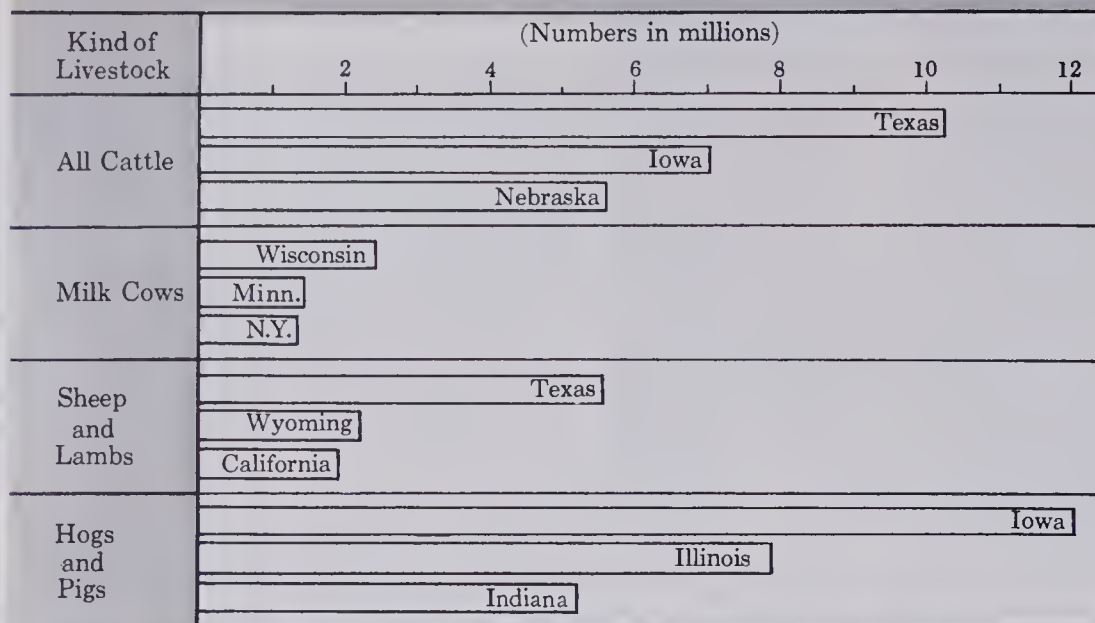


*Above.* A dairy farm in New Hampshire. The cows shown grazing are Ayrshires. *Right.* The beef cattle shown here are a breed called Aberdeen Angus. Meat from these steers will probably bring a good price at the market.





# LEADING STATES IN NUMBER OF LIVESTOCK ON FARMS\*



\*Figures for 1963

Notice that the three states which lead in the number of dairy cattle do not lead in the number of other livestock. Can you explain this? (Recall what you have learned about the centers of population in the United States and about crops raised.)

the West are grazed not only on privately owned ranches, but also on lands leased for grazing from the federal or state governments.

Many of the cattle raised on the western plains are sent to the Corn Belt to be fattened. Others are fattened in feeding lots near beet-sugar mills. Texas leads all states in the number of beef cattle raised, with Iowa and Nebraska next in order. In recent years, the beef cattle industry has been expanding rapidly in the Cotton Belt. There, grasses grow throughout the year and less shelter is needed because of the milder climate. Mississippi, for instance, now has more cattle than the states of Pennsylvania, Indiana, and Michigan, and also more than any state in the Rocky Mountains except Montana and Colorado.

Several hybrid strains of cattle have been developed in order to obtain good meat under certain circumstances. Some breeds of cattle thrive in hot weather; others cannot endure the heat. Breeds have also been developed which can withstand diseases often harmful to cattle. Cowboys ride the range to care for the cattle, much as they did in the early days of the West. On large ranches, however, trailer trucks and other machines are used in transporting and caring for the cattle.

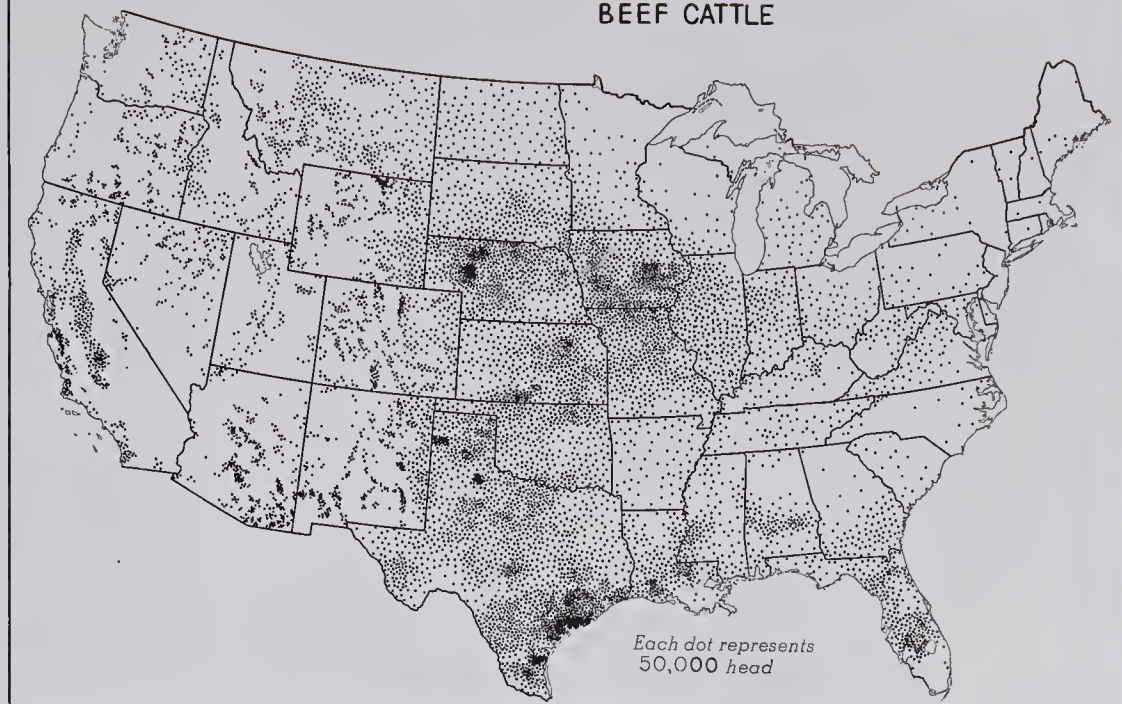
Dairy products, such as milk, butter, and cheese, are among the most common foods eaten in the United States. The amount of milk produced in the United States averages almost a quart a day for each person. Wisconsin leads the states in the number of dairy cows, and in milk and cheese production. Wisconsin has almost two and one-half million dairy cows, and produces almost as much milk each year as any other region of the nation. Farmers in New York, California, Minnesota, Pennsylvania, and Michigan also have large dairy herds.

Many products are made from milk, including non-fat dry milk, which can be stored without refrigeration, and canned condensed milk. Cheese of many kinds, butter, buttermilk, ice cream, and sherbets are also produced from this wholesome liquid. The milk is transported from farms to processing plants in refrigerated trucks or on fast-moving freight trains.

Dairies which bottle milk and make butter, ice cream, and cottage cheese usually are located near large cities where the products are to be sold or near transportation lines to those cities. Therefore, transporting liquid milk long distances, or milk products which melt or spoil easily, usually is not necessary. Cheese factories and processing plants which condense milk or

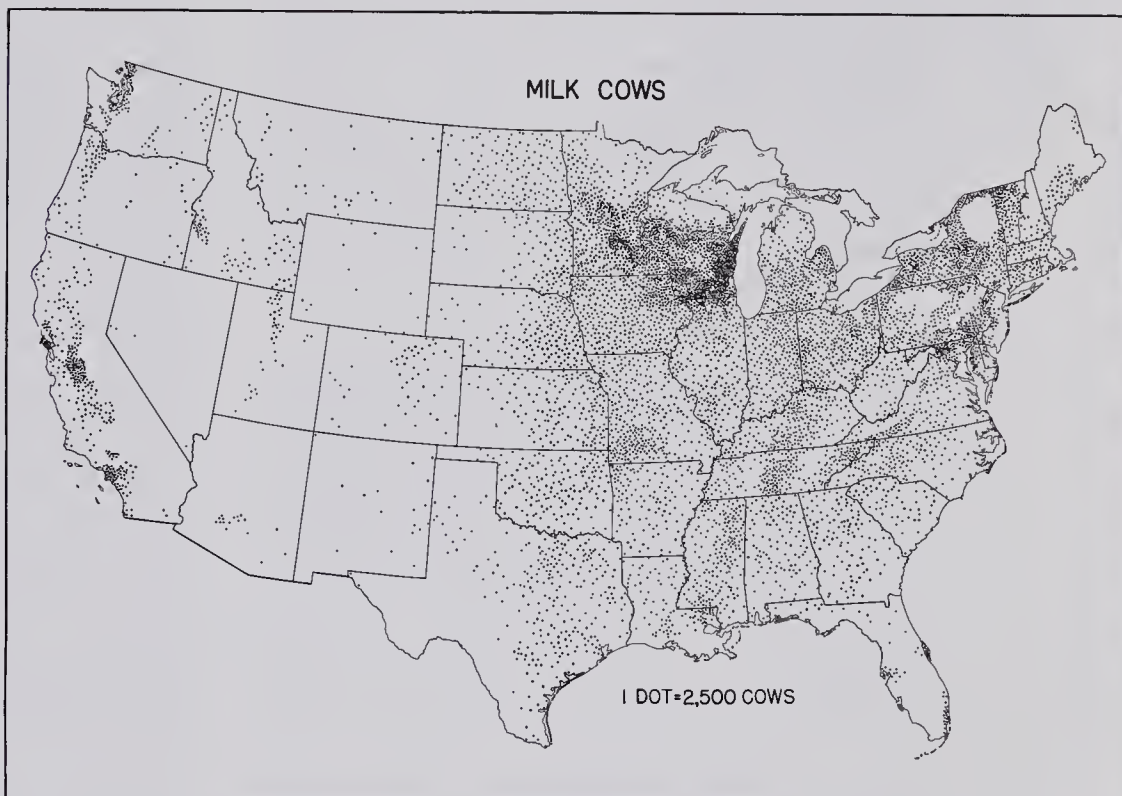


## BEEF CATTLE

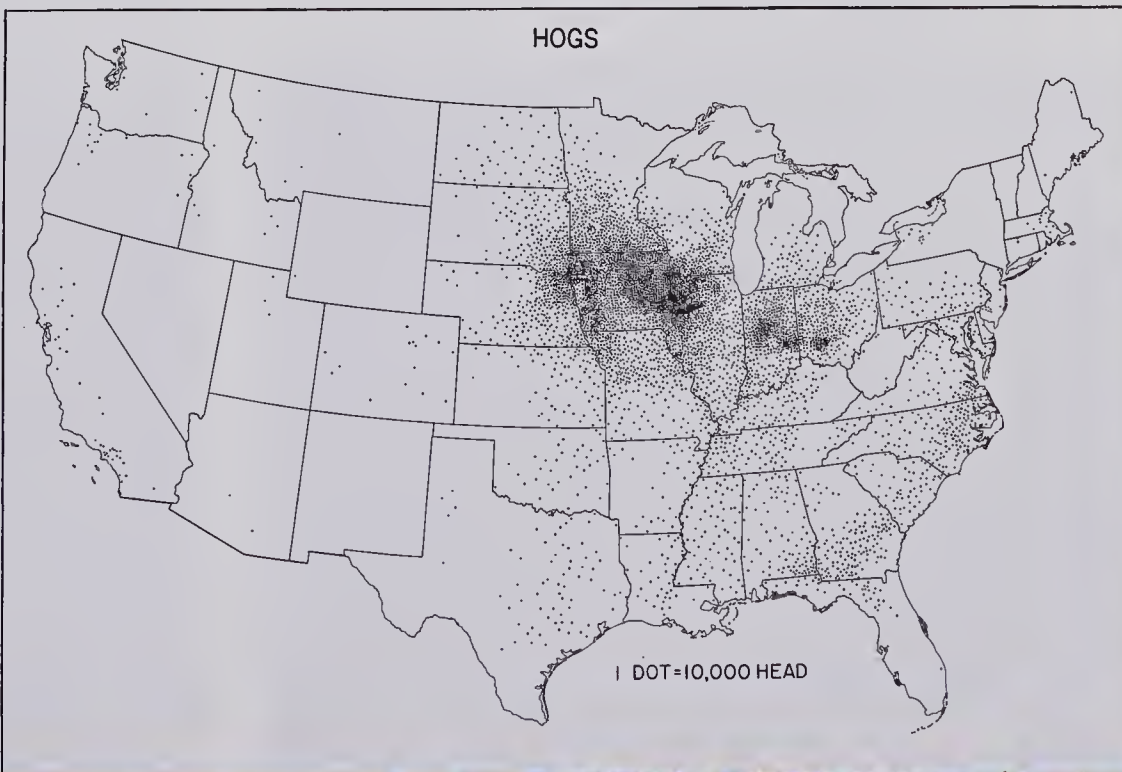


*Top.* The map shows where most of the beef cattle are raised. Where would you expect the major meat-packing centers to be located? *Center.* Compare the distribution of milk cows and beef cattle in the United States. *Bottom.* Why are many hogs raised in areas that produce large amounts of corn?

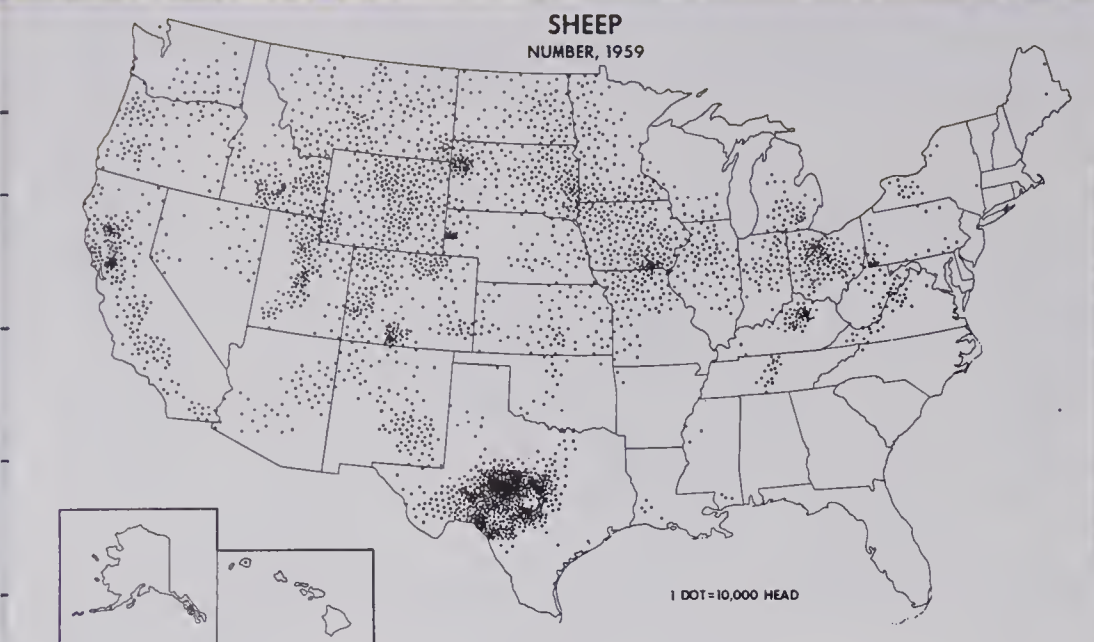
## MILK COWS



## HOGS







The map shows that sheep are raised in many sections of the country. The picture shows a sheep-shearing contest held in Colorado.

make non-fat dry milk usually are located in major milk-producing areas.

**Hogs.** About half as many hogs as cattle are raised on farms in the United States. Hogs grow rapidly and their numbers can also be rapidly increased. They are easily raised, as they are not fussy about what they eat. They consume the stalks of plants, fruits, and vegetables which are not eaten by humans, "left-overs" from the table, and skim milk. More hogs are raised in the Corn Belt than in any other region because they annually eat millions of bushels of corn. Usually more than one-third of the nation's corn crop goes to market in the form of pork. Corn is bulky and

brings a comparatively low price at the market. Farmers have found that they can make more money by raising hogs and feeding the corn to them. In the fall, after harvesters have cleaned the cornfields, the hogs can be turned into them to forage for themselves. Peanuts are another crop used for fattening hogs, particularly in the South Atlantic States.

People in the United States eat almost as much pork as they do beef. Much of the pork is cured at packing plants to make ham or bacon. Some of it is made into sausage and lard. A considerable amount of lard is exported each year from the United States to countries which need animal fat for cooking purposes.

**Sheep.** Sheep raising is one of the oldest agricultural occupations because sheep were among the first animals to be domesticated. Sheep were introduced into the United States with the early settlers. In the early days, the flocks had to be carefully guarded from wild animals and sheltered during the severe winters. Today, sheep are found on farms in almost every part of the country, but sheep raising is especially important in certain regions. Usually, sheep are grazed on hilly land which is not suitable for growing crops. More than half of the sheep in the United

This photo shows cows being milked on an ultra-modern farm in New Jersey. Cows are milked at least twice daily in this "milk parlor."





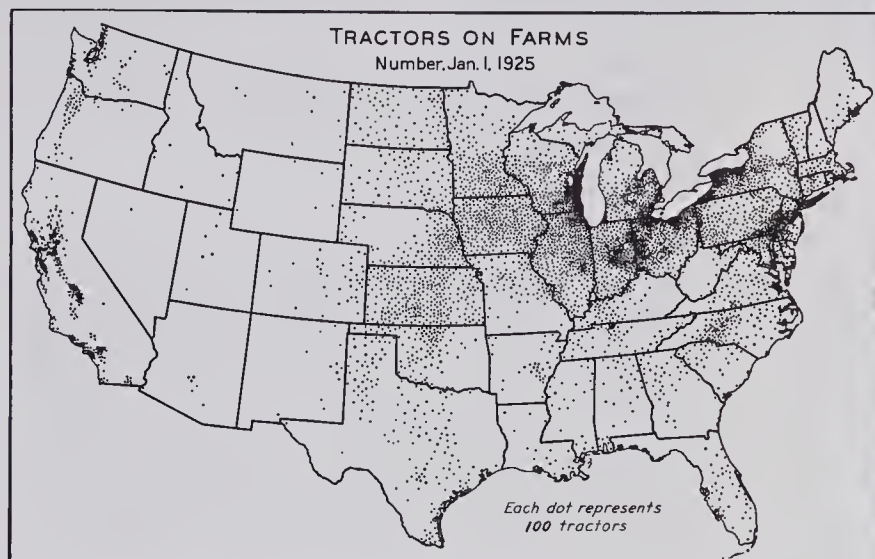
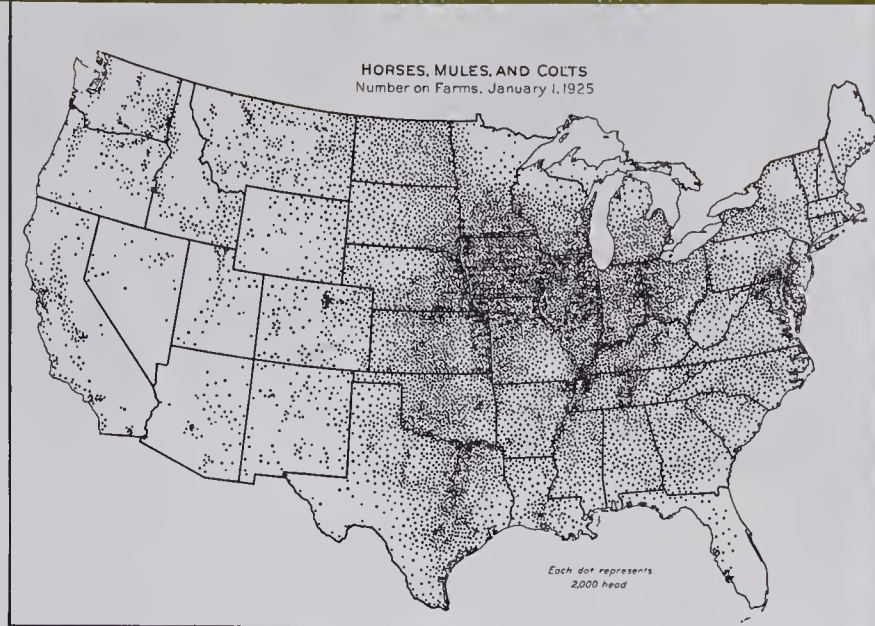
States are raised on the grazing lands of southwestern Texas and the ranges of the western states. Almost one-fifth of the sheep are raised in Texas. North Central states with large flocks of sheep include South Dakota, Iowa, Minnesota, and Ohio. (See the map on the left.)

Sheep furnish two products which are needed by people living in cool countries — wool and meat. Before cotton came into general use, wool was the principal cloth fiber used in middle latitudes. The preparation of wool and weaving of woolen cloth were well-developed household industries many centuries before weaving became a commercial industry.

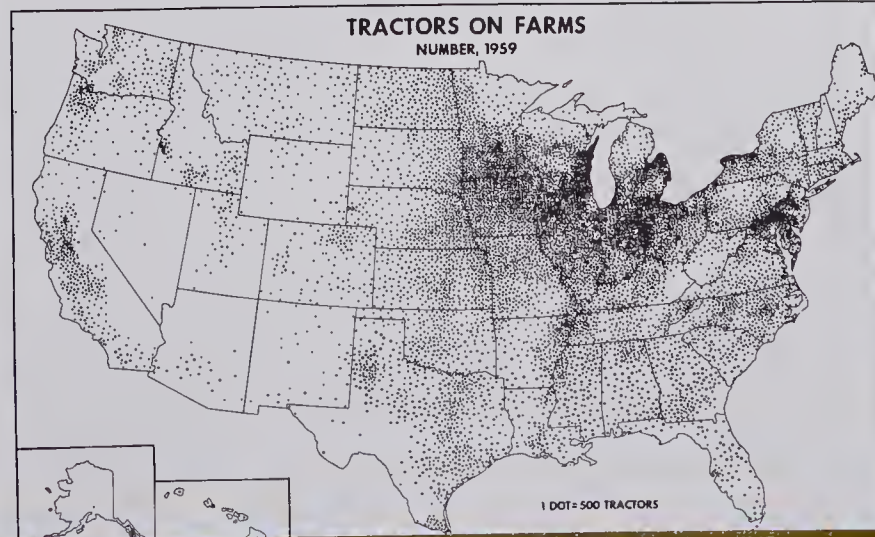
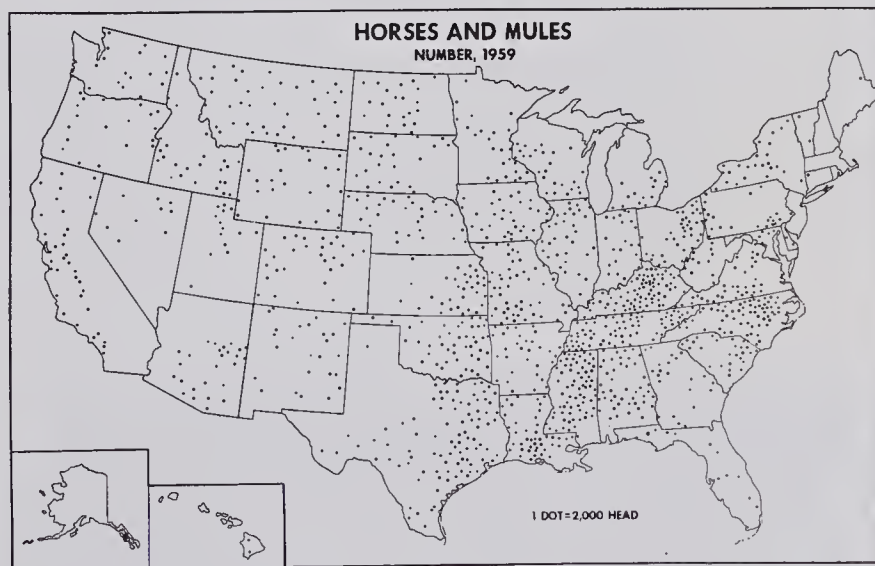
Special attention has been given in the United States to raising sheep which not only produce a high-quality wool but also furnish mutton of good quality. Leg of lamb is a favorite meat of many people who live in the United States, but much less mutton is consumed per person than pork or beef. Actually, for every pound of lamb or mutton, about 13 pounds of pork and about 17 pounds of beef are eaten.

**Horses and Mules.** Years ago, horses and mules were among the most valuable animals owned by farmers. They were used primarily to pull plows, harrows, cultivators, harvesters, and wagons. On most

It took thirty-three horses to draw this huge reaper. Tractor-drawn combines have largely replaced reapers in wheat-growing regions.



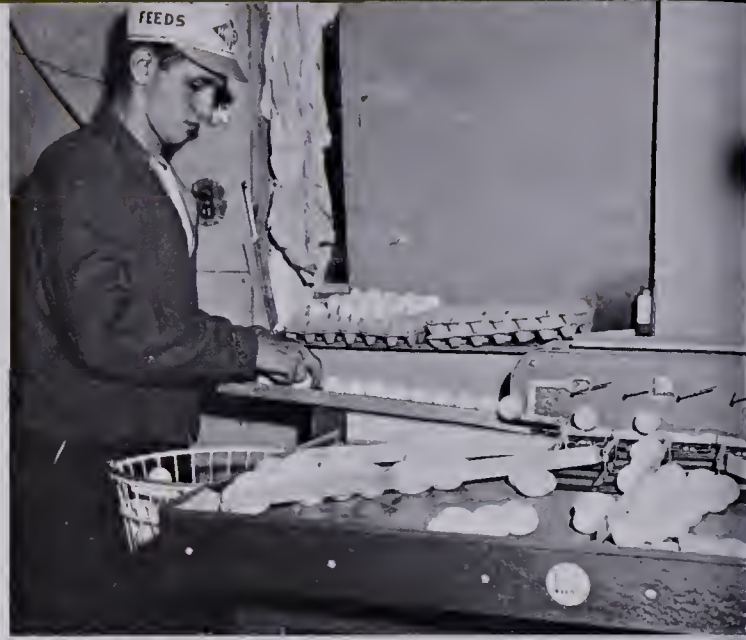
Do the maps on this page indicate that most farms in 1959 were more mechanized than farms in 1925?







Butter is weighed before it is packed into wooden tubs. Butter is shipped to all parts of the country from the dairy states.



This poultry farmer is placing eggs on a machine that automatically sorts the eggs according to their weight.

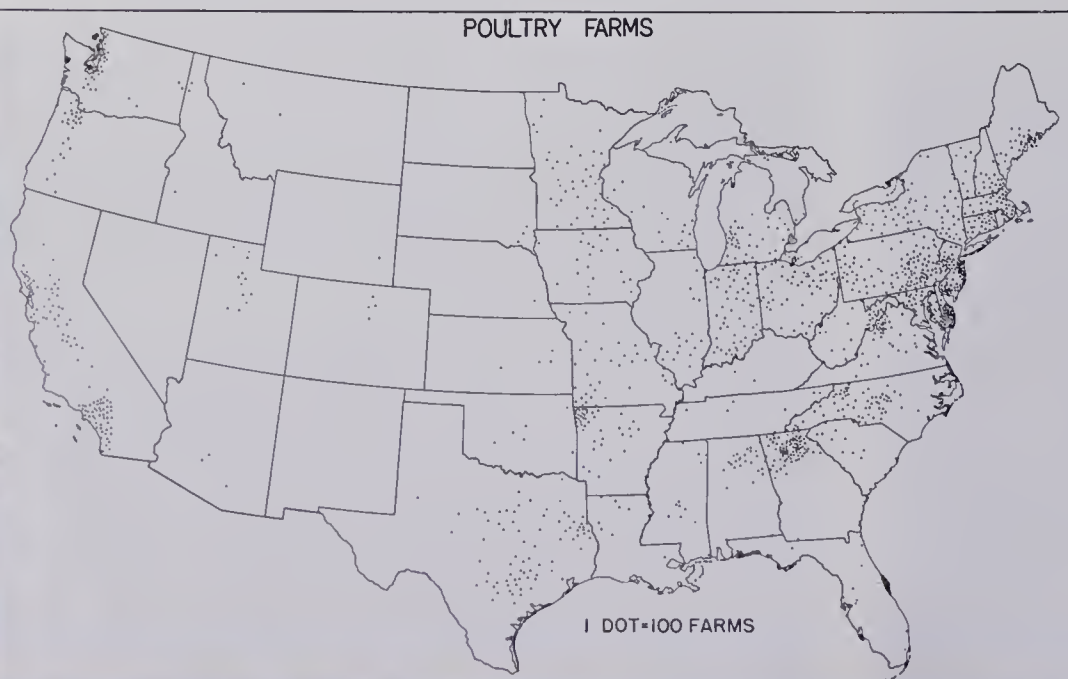
farms today, horses and mules have been replaced by tractors, trucks, and automobiles. Horses are still used in driving cattle on western ranches, and some farmers with only a few acres of land also use them. In many areas, however, horses are now used mainly for racing or for riding.

Because of increased mechanization, the number of horses and mules on farms has been dropping steadily. In 1915, there were more than 26,000,000 horses and mules in the country. Now there are so few that the government no longer keeps records.

**Goats.** People sometimes say humorously that goats eat tin cans and all sorts of rubbish. The truth is that goats need good, suitable food just as any animal does, but they can eat coarse plants and small

underbrush that other animals do not eat. Consequently, they are often grazed on brushland which the farmer wishes to clear, or in areas where other domesticated animals cannot find enough grass.

Goats are raised primarily for milk, wool, and leather. Goat's milk is very rich, and some people prefer it to cow's milk. Doctors sometimes recommend goat's milk for babies because it is easier to digest than cow's milk. Most of the goats in the United States are of the Angora breed and are raised primarily for their silky wool called mohair. Most of these Angora goats are grazed in southwestern Texas on the rugged Edwards Plateau. Arizona, New Mexico, and Oregon are other states in which goats are raised.



The dots on this map represent the poultry raised commercially on farms in 48 of the states. Many of the large poultry farms are located near the city markets.



**Poultry.** Each year in the United States large numbers of fowl are raised for meat or egg production. Kinds of fowl raised include chickens, turkeys, ducks, and geese, which together are known as poultry. The number of chickens raised far exceeds the number of other fowl. In a recent year, for instance, farmers raised about 320 million chickens on a non-commercial basis, while commercial poultry farms produced more than two billion chickens for meat. In the same year, only about 92 million turkeys were raised.

The meat of poultry, when well cooked, is delicious. Turkeys are a traditional food for Thanksgiving and Christmas in the United States, and fried chicken is a favorite food any time. Until the process of freezing meat was developed, butchers had to raise or buy live birds, and kill and clean them before they were sold. Now, frozen chickens and turkeys ready for the pan or oven are available at almost every food market in the country.

Each year in the United States chickens lay almost enough eggs to furnish each person an egg a day. Eggs, like meat, can be kept in cold storage and thus be available for use during the winter season when chickens usually produce fewer eggs. They can also be dried and reduced to a powder, or can be cracked and frozen. They are easily shipped in this form, whereas eggs in the shell have to be carefully crated and shipped. Eggs contain protein which is needed for growth and strength. They can be prepared in many different ways, and are an ingredient in many cooked foods and in some mixes for cakes, cookies, and puddings.

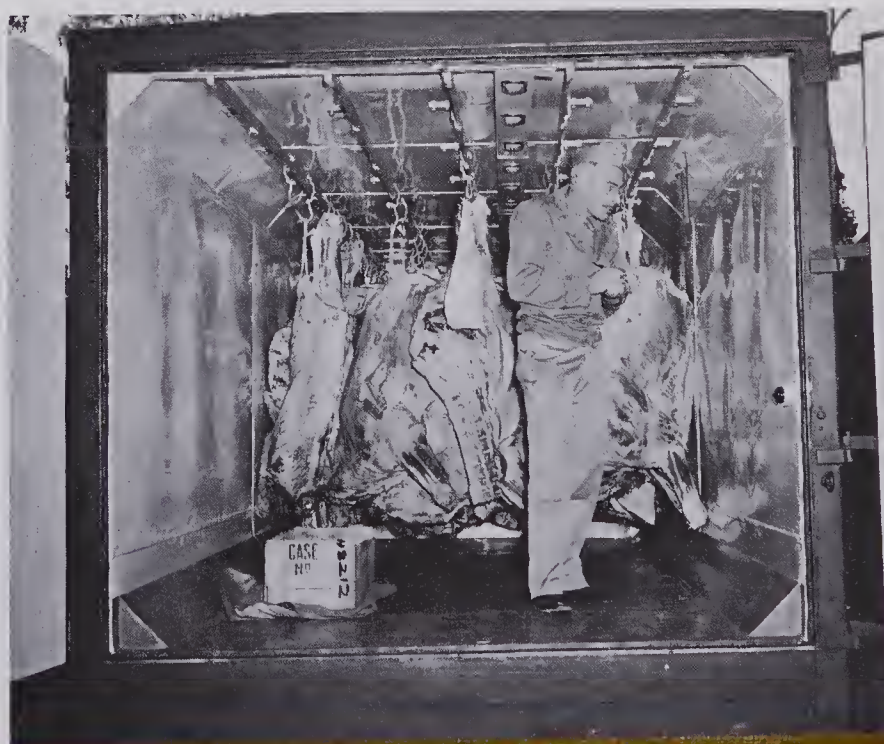
**The Meat-Packing Industry.** The demand for meat from millions of animals and poultry has resulted in a large meat-packing industry. This industry processes about 29 billion pounds of meat each year. In all, more than 135 million animals

and about two billion chickens are processed annually by the meat-packing industry. The buying, slaughtering, and preparation of meat, as you can see, is a huge industry. It is supervised by the government in order that high standards of quality and sanitation are maintained.

In the early days of this country, cattle and hogs were raised commercially only along the eastern seaboard and near cities with slaughterhouses. At that time animals usually were driven to market, and those that survived had to be fattened before they were slaughtered. Whenever possible, waterways were used to move the animals to market, but this transportation was slow and the animals had to be fed during the trip. Development of the railroads made it possible to ship animals swiftly across the country and to keep them in good condition. Many animals now are transported from feeding lots to slaughterhouses in huge trucks.

Before artificial refrigeration was introduced in 1870, the preparation of meat was a seasonal industry. Slaughtering was done in the cold winter months, but even then much meat was lost through spoilage. Fresh meat could be kept only a few days except during freezing weather. Meat which was not to be used immediately had

An Army inspector is checking a shipment of meat in a refrigerated truck.







*Left.* Some of the meat from choice carcasses is sold as steaks and roasts. *Right.* The apparatus shown in this picture is filling sausage casings. *Below.* View of the exterior of a modern meat-packing plant.



The shoe-making industry uses large amounts of tanned leather each year. This picture shows a shoe factory in Massachusetts.

Woolen yarn is woven into cloth in this powerloom. These machines require careful adjustments to produce high-quality cloth.





to be preserved by canning, drying, smoking, or pickling. Refrigeration has changed this. Slaughtering now can be done at any time of the year and the meat is preserved in cold storage.

The process of converting an animal into meat is not as simple as it seems. At one time, only parts of the animals which were good to eat were processed; now, almost nothing is wasted. Of course, fresh or frozen meat still is the principal product of the meat-packing industry, but many by-products also are sold. The hair from the hides is put in plaster and used to stuff horse collars and for other purposes. Hair from the tails is used to stuff furniture. Fine hair, cut from inside the cows' ears, is used in artists' brushes. Wool from sheepskins is saved and used for clothing.

The blood is caught, allowed to clot, then cooked and dried, and finally pulverized to form fertilizer. Horns and bones are used to fashion various useful articles such as buttons, knitting needles, knife handles, pipestems, and chessmen. Hides are tanned for leather, and hoofs are used to make glue. Intestines are carefully cleaned and dried, and are used as sausage casings. Certain glands from which a large number of medicinal products are manufactured are saved. Fat is used in making lard and soap. Finally, all the scraps and leftovers not otherwise used are converted into fertilizers. These by-products make it possible for the meat packer to sell meat at lower prices.

Though many small meat-packing plants are located throughout the United States, most of the very large ones are in the Midwest. This region is, of course, where most of the animals which supply the meat are raised. The Midwest also is an excellent distribution center for meat products because of its good railways, highways, and water transportation system. Omaha, Nebraska is the greatest meat-packing city in

the United States. Other major meat-packing centers in the U.S.A. are Chicago, Kansas City, Sioux City, and South St. Paul.

**The Leather-Goods Industry.** A related industry to meat-packing is that of tanning leather and producing leather goods. The products of this industry annually are worth almost two billion dollars. In a recent year, about 22 million cattle hides, six million calf hides, 30 million sheep and lamb hides, and 14 million goat and kid hides were tanned into leather. A variety of products, including shoes, boots, slippers, suitcases, wallets, and clothing, are made from the leather. More than 550 million pairs of shoes are made annually in the United States, about three pairs for every person in the country.

**The Woolen-Textile Industry.** The manufacture of woolen cloth was a home industry until textile machines were developed. Then the industry shifted from the home to the mill. Most of the woolen-textile mills are located in Pennsylvania and Massachusetts; Philadelphia and Boston are the principal wool markets. For many years, woolen goods produced in the United States were second in value to cotton textiles. Now, however, several synthetic fibers are used more extensively than wool fibers. At the present time, only about one-fortieth of the cloth woven annually in the United States is at least half wool. Wool is used in clothing, rugs, blankets, upholstery, and many other articles.

Most of the wool used in the United States comes from sheep, but other sources are goats, llamas, and alpacas. Although much wool is shorn from sheep each year in the United States, much of it also has to be imported. The leading wool-producing states are Texas, Wyoming, California, Montana, South Dakota, Colorado, and Utah. Much of the imported wool comes from Australia, New Zealand, Canada, and South American countries.





*Left.* The deep gullies in this meadow have been caused by erosion. *Right.* A picture of the same meadow taken three and one-half years later shows how grass and trees planted in the gullies prevented further erosion.

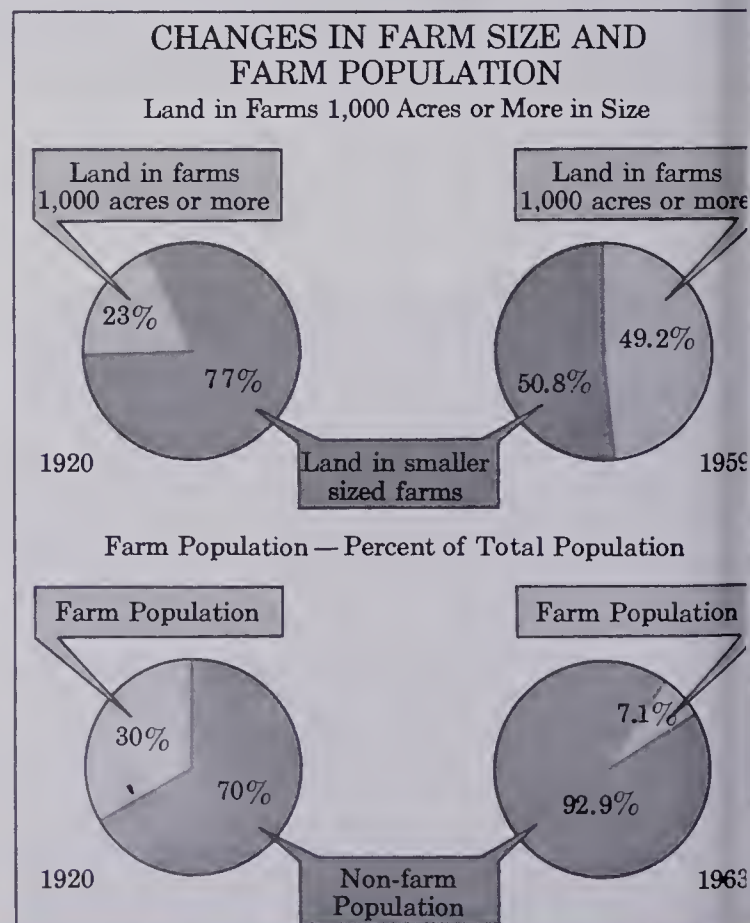
## AGRICULTURAL PROBLEMS

Farmers in the United States produce crops and livestock of great value. One might think, therefore, that the United States government does not have to spend much money on agriculture. The opposite is true, however. One of the most difficult problems the government has faced in the past twenty years has been overproduction of basic crops. To prevent prices from dropping to low levels, which would mean that farmers would have little or no income, the government guarantees price levels on many crops. In recent years, the government has spent more than four billion dollars annually to support farm income. Much of this money is spent to store surplus wheat, cotton, and dairy products. Another billion dollars has been spent annually on the conservation and development of land and water resources and on agricultural research and services.

Many people who live in cities have difficulty in understanding why the government should spend so much money keeping prices high for the farmers. Such people think it would be well for prices to drop, so that their food would cost less. The problem has no simple solution, however. If farm prices were permitted to

drop to the levels they would reach without some government support, few farmers would be able to continue in business. Moreover, these farmers would have to stop spending money for manufactured goods. Then the factories would have to stop producing so many articles. If that happened, many city people would be out of work, and they would not be able to buy as much food even if the food were much cheaper. The government, therefore, has

What do you think has caused the changes in farm size and population since 1920?







The government buys, stores, and ships much of the surplus food produced in the United States. *Left.* Surplus cheese is inspected in a warehouse. *Right.* Some surplus foods are shipped overseas.

been attempting to find ways of keeping production high and raising the farmer's income in relation to what he buys.

Many ideas have been suggested for using surplus foods. Some surplus food is used in inexpensive lunches for children in school. Some surplus food is sent to countries which are unable to produce enough food for their people. Usually, this food is sold to such countries at cost or even below cost. When such action is taken by the United States government, farmers in other exporting countries sometimes complain because they cannot sell their produce at higher prices. Also, some people in the United States object because of their high taxes caused partly by the surpluses.

The "farm problem," which this collection of problems is usually called, is not likely to be solved in the near future. As the population increases, and more good farmland is taken out of production to build highways and cities, the opposite problem may develop. In time, the United States may have to find ways of cultivating much more land than is now farmed. Most of the productive but non-cultivated land in the United States is located in the western part of the country. Much land there could be farmed profitably if good

supplies of water were available for irrigation. Watch for newspaper articles indicating what the government is doing, and what individuals or groups think the government should do, about the farm problem. What do *you* think should be done?

### QUESTION BOX

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1. To what use is the greater part of the cultivated land in the United States devoted?
2. What crops are raised almost exclusively as feed for animals?
3. Where are the greatest number of beef cattle raised? Dairy cows? Sheep?
4. Why are more hogs raised in the Corn Belt than in other regions in the United States?
5. Why are there fewer horses and mules on farms today than in 1915?
6. What are some of the by-products of the meat-packing industry?
7. Why is it possible for farmers in the United States to raise more food than is needed, even though relatively few people are farmers?
8. What are some of the major agricultural problems in the United States?





A pulp mill in Alaska. Mills such as this one provide the raw materials needed in producing paper and various other paper products.

## LUMBERING AND RELATED INDUSTRIES

The early settlers on the eastern coast of the United States found a land of dense forests that seemed to extend endlessly toward the west. These forests were of great value to the colonists, particularly as a source of building material and fuel. Forest resources also were important in the development of early industry and trade. The forests not only furnished lumber for ships, homes, and stores, but also were the home of valuable meat and fur-bearing animals. It was necessary to obtain land for raising crops, however, so the colonists attacked the forests with axes and with fire. As time went on, vast amounts of timber were destroyed with little thought given to its value, because trees seemed so plentiful and the supply almost inexhaustible.

**Forest Regions of the United States.** Nearly half of the land area of the United States once was forested. At that time, because few people lived on the continent, the location of forests was determined by rainfall. East of the Mississippi River, most of the land was forest-covered. On the prairies and plains west of the Mississippi River, trees were found only along streams. Many slopes in the Rocky Mountains and in the Northwest were also covered by forests.

The forests of the United States can be divided into seven regions as shown on the map on the next page.

The *Northern Forest* extends from Maine westward to Minnesota, and southward in the Appalachian Highlands to northern



Georgia. The most valuable trees found in the Northern Forest are conifers or cone-bearing trees. Of these, the white pine has been by far the most valuable partly because its wood is easily worked and is very durable. Original stands of white pine have almost disappeared; the white pine lumber now obtained from the Northern Forest comes almost entirely from second-growth trees. Other important conifers in the Northern Forest are the spruce and hemlock, both of which are used to make wood pulp for paper.

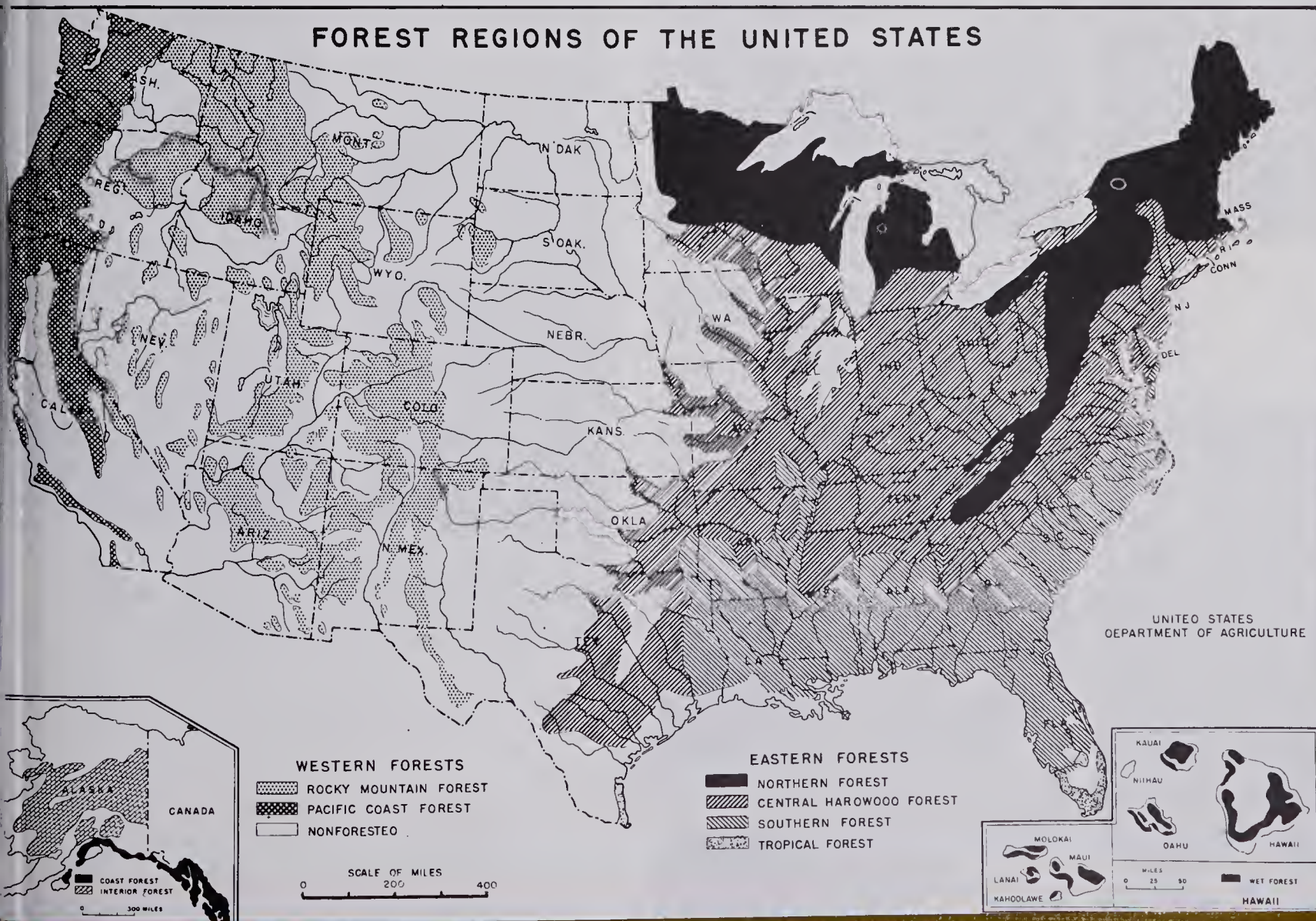
Hardwoods, or broad-leaved trees such as beech, birch, oak, maple, ash, hickory, and elm, are scattered throughout the Northern Forest. These are called hardwoods because their wood is hard as compared with that of pine or spruce. Hardwood is used extensively in making furniture, flooring, and handles for tools. The location of major population centers

and the waterways near the Northern Forest resulted in the rapid cutting and marketing of the timber. This forest region now contains only about eight and one-half per cent of the live sawtimber growing in the United States.

The *Central Hardwood Forest* covers the area between the Northern Forest and the Southern Forest. (See the map on this page.) The Central Hardwood Forest extends in a narrow band from the Atlantic Coast in southern Massachusetts southward, just east of the Appalachian Highlands. It also covers most of the states west of the Appalachian Highlands and east of the Mississippi River, except in the far north and along the Gulf Coast.

Hardwoods such as ash, elm, chestnut, hickory, oak, walnut, maple, sycamore, and gum are plentiful in the Central Hardwood Forest. Some conifers also grow in this region, but the hardwood trees covered most

This map shows the location of the major forest regions in the United States.







*Left.* Turpentine is made from the sap of the slash pine tree, growing here in Georgia. It is distilled to obtain oil of turpentine.



*Right.* The white pine trees which grow in the Northern Forest are used for building homes. Their wood is durable and easily worked.



*Left.* The yellow pine thrives in the humid climate and sandy soil of the Southern Forest. Much of it is made into newsprint.



*Right.* The wood of the maple tree, which is found in the Northern, Central, and Southern Forests, is popular for making furniture.



*Left.* Can you tell the Douglas firs from hemlocks in this mixed forest? Plywood used in this house was made from the Douglas fir.



of the land when the settlers moved westward. Much of the timber in this region has disappeared as a result of lumbering and clearing the land for agriculture. A few large forests are still found on the hilly sections of the Appalachian and Ozark Plateaus.

The *Southern Forest* extends along the Atlantic and Gulf Coastal Plains from southeastern Virginia into eastern Texas. The warm moist climate and the sandy soil in this region favor the growth of yellow pine trees. These trees now are the main source of wood pulp and the second most important source of lumber in the United States. Several other trees are commercially important in the Southern Forest. Some trees which produce lumber resistant to water damage are found in swampy lowlands. Hardwoods of the Southern Forest include the gum, ash, red maple, hickory, sycamore, yellow poplar, elm, cottonwood, willow, black cherry, and oak. For a number of years, the Southern Forest was the leading lumber-producing area in the country, but that distinction is now held by the Pacific Northwest.

Small areas of *tropical forest* are found in southern Florida, southeastern Texas, and Hawaii. Mangrove, bay, cypress, palm, and palmetto trees grow in Florida and southeastern Texas. In Hawaii, several tropical trees such as the koa, candle-nut, ohia, sandalwood, and palm are found.

The *Rocky Mountain Forest* grows on the mountain ranges from New Mexico and Arizona northward to Canada. In this highland climate, the amount of rainfall and the temperature are determined by altitude. At lower altitudes in this region, only short grass and desert vegetation will grow. The higher mountain ranges, however, intercept rain-bearing winds and cause them to rise, cool, and give up sufficient moisture for tree growth. Much of the Rocky Mountain Forest grows in areas

which are difficult to reach and far from large centers of population. Large areas of this forest also have been set aside as national forests by the government. These are two reasons why a large part of the original forest still remains. The Rocky Mountain Forest includes several varieties of pine, spruce, fir, and juniper trees as well as aspen, cottonwood, and scrub oak.

The *Pacific Northwest Forest* probably is the most magnificent coniferous forest in the world. It extends northward from northern California through Oregon and Washington. The soil, the plentiful rainfall, and the mild winters of the region favor the growth of splendid trees. The sequoias in California, of which only a few groves are left, and the redwoods are the largest of the trees in the Pacific Northwest Forest. Some of the sequoias are twenty-five feet in diameter at the base and three hundred feet high. They are interesting but, because so few of them remain, are not important commercially.

The Douglas fir is the most important timber tree of the Pacific Northwest Forest and the most important source of lumber in the United States. The Douglas fir is a large tree, often reaching a diameter of four to six feet and a height of nearly two hundred feet. Some Douglas firs have reached a height of 300 feet and an age of 1,000 years. Fir is an excellent wood for building purposes, both for interior and exterior use. Other kinds of trees found in the Pacific Northwest include other varieties of fir, several varieties of pine, spruce, larch, hemlock, red cedar, and red alder. As you have learned, this region now supplies more lumber than any other region of the United States. Oregon ranks first among the lumber-producing states. Each year, more timber is being cut in this region than is growing, however, and the supply of good timber will decrease unless more extensive conservation measures are taken.





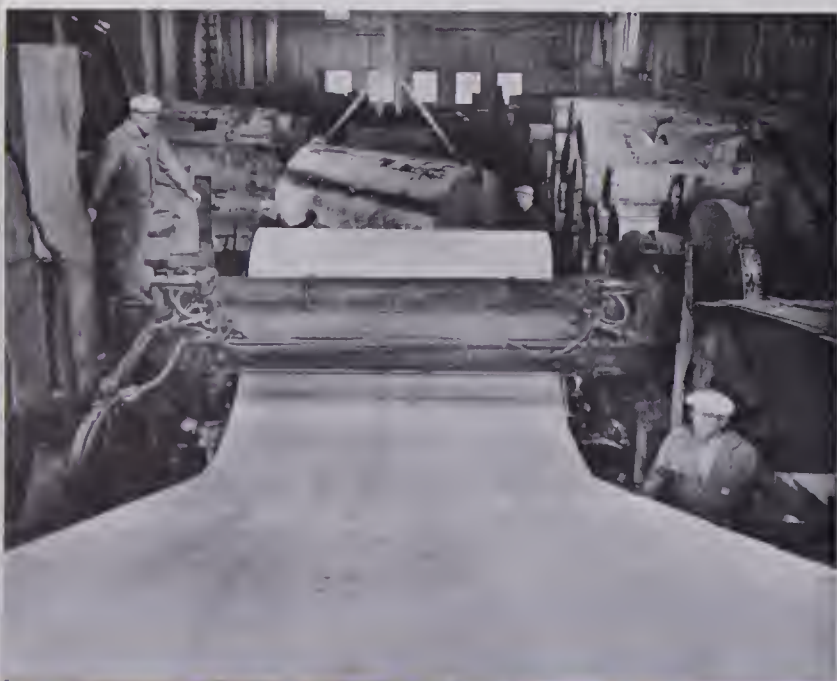
Lumbermen in California are cutting a Ponderosa pine near its base to save wood.



Modern machinery makes cutting and loading heavy logs safer, faster, and easier.



Above. A lumber mill in Arkansas. The state annually produces about 1.5 billion board feet of lumber. Below. A lathe peels the veneer from a Douglas fir to be used in plywood. An eight-foot "peeler block" (shown hanging in rear) produces about two thousand square feet of plywood.



The *Alaskan Forest*, as the map on page 309 shows, extends across central Alaska on both sides of the Yukon River and also along the southeastern coast. Lumbering in central Alaska is difficult because good transportation facilities are lacking. As a result, the lumbering industry is concentrated in the southeastern coastal area. It is growing rapidly there. The western hemlock of the Alaskan Forest is valuable for its soft wood which is used as building material and in making pulp. Other trees in the Alaskan Forest include the Sitka spruce, western red cedar, and Alaska cedar.

**Lumbering.** Much work must be done by lumbermen before the logs enter the sawmill. The trees are felled, the trunks are cut up into logs, and the logs are transported to the mills. Lumbering methods vary somewhat among the different forest regions because of differences in climate, topography, and the kinds of trees growing.

Most lumbering operations in the United States now are highly mechanized. Portable electric saws, tractors, cranes, and trucks are used to speed the work of the lumberman. Different ways of transporting the logs to the mills are used. Whenever possible, the heavy logs are floated down rivers because this is the cheapest method of moving them. In many areas, however, the logs reach the sawmills by truck or train. To move the logs from the



forest to the stream, railroad, or road, many interesting methods are used depending on the terrain and climate. The logs may be dragged by tractors or by engine-pulled cables, or if cut in the mountains, they may be slid down chutes to a stream.

The final destination of all logs is the sawmill. There, they are cut into lumber which may be used for building purposes, or fashioned into hundreds of other articles.

**Veneer and Plywood.** Much timber is now used in two manufactured products called **veneer** and **plywood**. Veneer is a thin layer of wood sliced or sawed from a log. A log may be sliced lengthwise, as it is sawed in making boards, or it may be placed in a machine which revolves it against a sharp knife. In this second way of cutting, the log is turned until only a small inner core of it is left.

Plywood consists of several sheets of veneer placed crosswise and glued together to form a solid board. For many purposes, plywood is better than a thick board cut directly from a log because it is not easily broken and is less likely to warp. Huge quantities of wood, particularly Douglas fir, are used to make plywood.

Plywood is now extensively used in building homes. If the plywood is intended for exterior use, a waterproof glue is used in making it. Plywood with a hardwood veneer surface is now used in manufacturing furniture. It is much cheaper to use such wood than to use the solid hardwood. Many radio and television cabinets made in the United States are made of plywood with a hardwood veneer.

**Paper Making.** At one time, most paper manufactured in the United States was made from rags and flax fiber. In the middle of the 19th century, the steady population increase and the growth of printing and packaging caused an enormous demand for cheap paper. A way of making paper from wood pulp inexpensively was

then developed. Today, wood pulp is used to make more than nine-tenths of the paper produced in the United States. Southern pine, spruce, hemlock, poplar, cottonwood, and tamarack are the woods most used in making wood pulp.

Both chemical and mechanical processes are used in making wood pulp. In the chemical process, the wood is cut into fine chips which are then cooked in chemicals. The cooking reduces the wood chips to a pulpy mass which is the basic ingredient used in making paper. In the mechanical process, blocks of wood are ground against grindstones until the wood is reduced to fine shreds. Pulp made mechanically is used in making newsprint and cheaper grades of paper.

Some high-quality papers are still made from rags, but most grades of paper are made from mixtures of different kinds of pulp. The demand for paper is so great in the United States that large amounts of wood, pulp, and paper are imported. Most of the imported wood pulp comes from Canada, a leading producer of wood pulp. The Scandinavian countries also are important sources of wood pulp.

For many years, pulp and paper mills in the United States were largely concentrated in the northeastern and Great Lakes states for several reasons. (1) The great paper markets are located in these same areas. Location near the markets lowered the cost of transporting finished paper which, when packaged or rolled, is very heavy. (2) These areas are close to important sources of wood used for making pulp, including both the Northern Forest and Canada. The high cost of transporting logs makes it necessary to have pulp mills near the forests. (3) The mechanical process of making wood pulp requires much cheap power. As water can supply this power, many of the mills were located along rivers.





*Above.* This pulp and paper mill on a river in Tennessee manufactures newsprint and pulp for sale throughout the country. *Left.* A giant "Gantry" crane lifts an entire truckload of pulpwood in the lumber yard of a Florida paper mill. *Right.* A conveyor belt runs almost the entire length of this large wood pulp plant in Wisconsin. It carries logs from the barking drums, where the bark is removed by machinery, to the chipper, where the logs are cut down into small chips. The chips are then used to make pulp.



*Above.* This is wood pulp, ready to be made into paper. *Above right.* This machine rolls, presses, and dries pulp into paper. *Below right.* Huge rolls of newsprint await shipment in this warehouse.







*Left.* A wind-swept fire roars through a pine forest in Florida. *Right.* Damaged trees can often be saved by filling in decayed sections.

In recent years, since it was found possible to produce pulp and paper from southern pine trees, this industry has greatly increased in the southern states. Kraft paper, used for wrappings and paper bags, is produced in great quantities in southern mills. A process of making newsprint from southern pine trees also has been perfected, and a number of mills which make newsprint have been built recently in the southeast. Because the southern pine trees grow more rapidly than the northern conifers, a constant supply of wood for the pulp mills can be obtained from a smaller land area.

**Our Decreasing Forests.** According to estimates made by the United States Forest Service, more than three-fourths of the original timber resources of the nation are probably now gone. You already know some reasons for this. Forests were destroyed when the early settlers cleared the land for crops. The forests also were used freely because they seemed to be unlimited. This constant use of the forests for lumber and other products exceeded the growth of trees. For many years, logging practices were very wasteful. Often, only the best parts of a tree were used. Men's desire to get the timber out quickly and cheaply often caused the destruction of young trees which would have restored the forest.

Another reason for diminishing forest resources is that fire has destroyed millions of acres of trees. During the last few years, there have been about 100,000 fires a year which have burned annually almost four million acres of forest land. Statistics show that most of these fires have been caused by careless people, although some have been started by lightning.

Insects and diseases also have taken their toll of the forests. The European elm bark beetle has spread a fungus; elm trees also have been attacked by a virus. Together these forces killed many of the elm trees which once grew east of the Mississippi River. Chestnut blight has caused complete destruction of commercial stands of chestnut trees in the eastern states. A fungus which caused white pine blister rust has also killed many fine stands of timber in western states.

**Timber for the Future.** The United States uses more wood than any other country except the U.S.S.R., and is using wood faster than it can be replaced. In recent years, better balance has been achieved between consumption and production. Several possible lines of action can be taken, and some have already been started. Other materials, such as concrete, stone, and plastic, may be used in place of wood. Imports may supply certain shortages, but world demand will in time



exhaust foreign reserves, too. Rising prices may reduce consumption of wood and paper, especially waste of them. The best solution, however, seems to be growing more timber and decreasing waste in the forest, at the sawmill, and in all wood-using industries. Forests now cover about one-third of the land area of the United States. Five-sixths of the land in the Northwest is forest-covered, and in the South about half the land is forested. Not all of these forests, of course, are presently producing commercial timber of good quality, but with proper management, yields could be increased greatly.

Much of the nation's forest land is owned by individuals, lumber companies, mining companies, and railroads. About nine-tenths of our timber comes from these forests. Most of the lumber companies are now taking good care of their forest lands, practicing reforestation and growing timber as a crop. Nevertheless, there are millions of acres of unused land in the United States which are suitable for growing trees. At one time, this land was forest covered and, of course, should be replanted. The United States Forest Service believes that it is possible to grow timber crops large enough to meet the nation's demand for wood. Progress toward that goal has been made in recent years.

*Below.* A crew plants shortleaf pine in a gul-  
lied field in Mississippi. *Right.* A tree farm  
in California. Careful cutting of this mixed  
stand of first and second growth pine assures  
a steady supply of timber.

**National Forests.** In 1891, Congress au-  
thorized the President of the United States  
to set aside areas in which no one would  
be allowed to cut timber without permis-  
sion from the government. This action  
marked the beginning of the national for-  
est system. There are now more than 150  
national forests, covering an area of about  
226,000,000 acres. Most of the national for-  
ests are in the West and in Alaska. Since  
the government held public lands there  
much later than it did in the East, more of  
the land could be reserved.

At first, national forests were looked  
upon as reserves and were not used. Then  
men learned that timber is a crop and must  
be harvested when ripe or it will be wasted.  
A National Forest Service was begun, op-  
erated by persons with scientific training  
in tree management. Persons are now em-  
ployed to plan trails and roads, to fight  
fires and diseases, and to see that the for-  
ests are protected.

Timber is carefully cut under the super-  
vision of the Forest Service. Trees are  
planted where others have been cut and  
where fires have destroyed the forest  
cover. Open land in the forests is leased





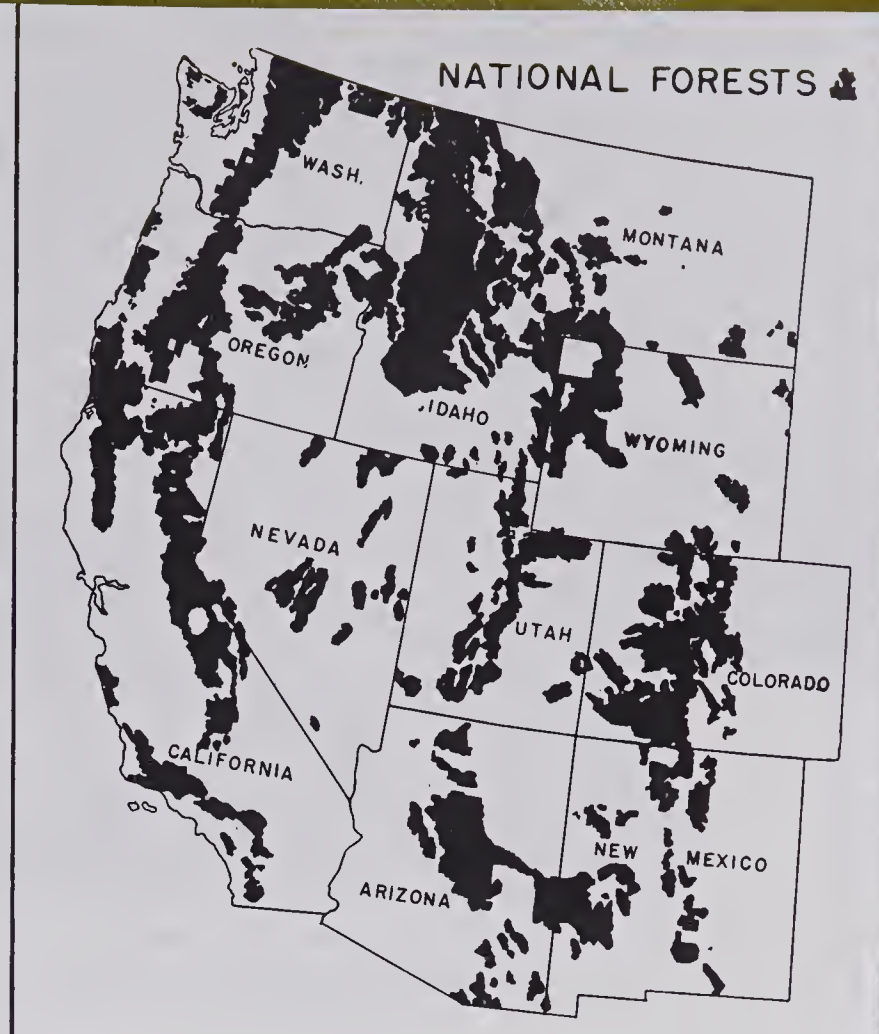


A forester explains woodland management to boys attending a summer forestry camp.

to cattlemen and sheepmen for grazing purposes.

The law creating national forests stated that forests would help prevent floods and erosion. In attempting to carry out this purpose, the Forest Service makes a special effort to maintain forests on steep slopes. Trees slow down the rapid runoff of water, thus reducing the loss of soil and preventing floods. Moreover, the trees slowly release the water to springs and streams, thus producing a more even flow. An even flow of water is important in streams used for irrigation, navigation, and water power.

State governments also are working to save forests and to use forest resources wisely. Almost all states now have forestry agencies. States own many acres of forest land, and most of them maintain state forests or parks. Some states have established nurseries where trees are grown from seed to be planted in forests and along roadsides. They also have developed systems of preventing damage to forests by fire, insects, and disease. State forestry agencies give farmers and forest owners advice and assistance in handling their timberlands. Courses in forestry are given in many state colleges and universities.



Most of the nearly 150 national forests which have been established since 1891 are in the western states.

### QUESTION BOX

43

1. What are the seven main forested regions of the United States?
2. What is a coniferous forest?
3. What are the two most important trees now cut commercially in the United States? What are the main uses made of the wood from these trees?
4. Where were most pulp and paper mills located for many years? Why? (Give three reasons.)
5. In what region have many pulp and paper mills been built recently?
6. What is the difference between veneer and plywood?
7. Why have the original timber resources of the United States been used so rapidly?
8. Why is timber cut in national forests?





Tuna, mackerel, and shellfish are important catches along the southern California coast. Here a fishing boat returns to its dock in San Pedro.

## FISHING

Fish is a favorite food of many people in the United States. The seafood industry is directly responsible for the employment of about 200,000 people. Another 300,000 workers are employed in industries making ships, nets and other gear, and canning and freezing equipment.

The annual seafood catch by commercial fishermen in the United States has, for several years, been more than five billion pounds, worth about 360 million dollars. Fishing is also a popular sport with millions of men and women. Many industries make rods, reels, flies, lures, boots, and other equipment needed by amateur fishermen. Fishing in the United States is a big business!

**Where Fish Are Found.** Some fish are found in almost all the rivers and lakes of the United States. Commercial fishing is limited, for the most part, to the Great Lakes and the **continental shelf**, which is the shallow ocean floor along both coasts. The three major areas of fishing, as meas-

ured by the number of people employed and the value of the catch, are the New England States, the Gulf States, and the Pacific States.

Off the New England Coast, haddock, ocean perch, herring, flounder, cod, and mackerel are caught in great numbers. This region also is one of the great suppliers of lobsters and clams. The fisheries of the Gulf Coast supply great quantities of shrimp, and also large amounts of mullet, red snapper, Spanish mackerel, bluefish, and oysters. The most valuable catches off the Pacific Coast are tuna and salmon, both of which are canned. Other fish caught in the Pacific Ocean include mackerel, herring, halibut, and pilchard which are also called sardines.

Other important fishing areas include the Atlantic Coast south of New England, Alaska, and the Great Lakes. The southern Atlantic coastal area, especially Chesapeake Bay, leads in the production of oysters. Menhaden, which are used in



animal and poultry feeds and are a source of fish oil, are also caught in large numbers in this region. Alaska, like Washington and Oregon, is a major center for salmon fisheries and canneries. The Great Lakes provide fresh-water fish, such as pike, perch, cisco, trout, and whitefish.

**Ground Fishing in the Atlantic.** Fish that feed on the bottom of the ocean are known as **ground fish**. Ground fish including cod, hake, haddock, and halibut are caught along the Atlantic Coast from Delaware Bay northward. The best fishing grounds, however, are on the **banks**, which are large areas of the continental shelf that are high enough to form underwater plateaus. In this area, the depth varies from 300 feet to 50 feet. Part of this system of banks off the coast of Newfoundland is called the Grand Banks. Ground fish gather on the banks in great numbers because food is more abundant there than in deeper water. Hundreds of fishing vessels go to the banks to catch fish.

Fishermen catch many of the ground fish by a method called **trawling**. Bag-like nets called **trawl nets** are dragged along the ocean floor by one or two boats. Periodically, when the nets are heavy, they are hauled on board and the fish are dumped on deck. Then the fish are packed in ice to be preserved. On some large ships, they are cleaned, frozen, and packed.

These fishermen are hauling a trawl net aboard. It is used in catching ground fish.



Commercial fishermen in Lake Michigan are shown scooping whitefish from their nets.

Some ground fish are caught on long lines or **ground lines** to which baited hooks are attached. Men go out from the main vessel in small boats called **dories** and set the lines, which settle down to the feeding ground. Every few minutes the lines are pulled up, the fish removed, and the hooks rebaited.

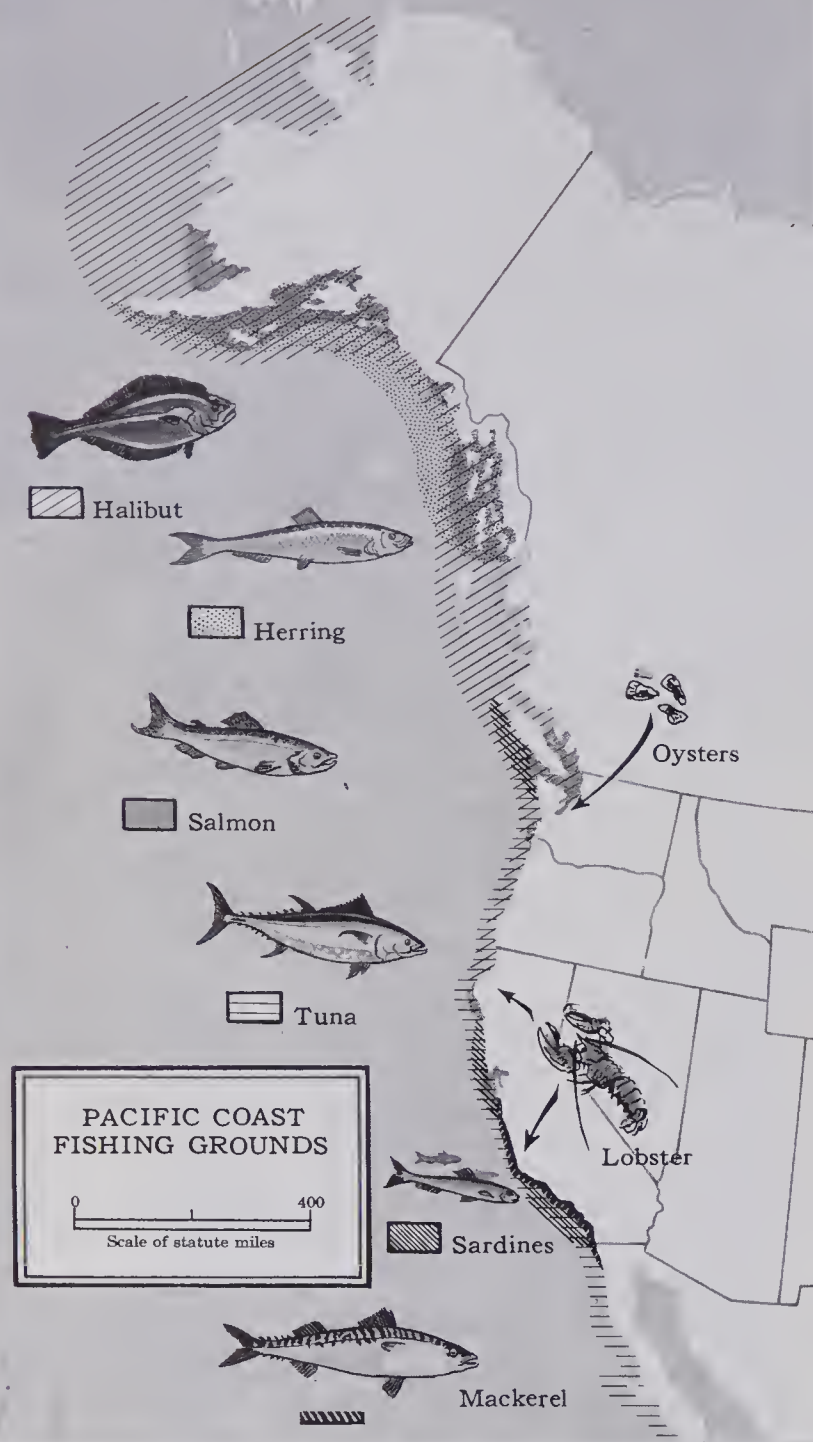
Ground fish are marketed fresh, frozen, or dried. Large quantities of frozen fish are sent to interior cities. Leading fishing ports in New England include Boston, Gloucester, and New Bedford, Massachusetts, and Portland and Rockland, Maine.

**Mackerel Fishing.** The contrast between ground fishing and surface fishing may be made clear by describing how mackerel are caught off the New England Coast. Mackerel feed near the surface and travel

Shrimp, crab, and other seafood are brought into San Francisco's Fishermen's Wharf.







in schools. They are related to the tuna, the valuable fish caught in large numbers off the coast of California. Many mackerel are caught by seining or snaring with nets.

When a school of mackerel is sighted, part of the fishing crew gets into a dory. Some men row the boat and others set the net. Often, this net is a **purse seine**. The purse seine is let down into the water in a large circle, left open at the top and bottom. When many fish are surrounded, the bottom of the net is pulled together by

lines which act much like a drawstring. Do you see how this net got its name? The large fishing vessel then raises the seine and the closely packed mackerel come into sight. The mackerel are dipped out onto the vessel's deck, and then placed on ice in the hold.

Instead of the purse seine, **gill nets** may be used to trap mackerel. Gill nets are much like tennis nets, but range in length from 150 to 180 feet and average 18 feet in height. Cork floats hold the gill nets up after they have been placed in the water. Leaden weights along the bottom of the nets keep them straight down in the water. Mackerel swimming into the gill net find the openings large enough for their heads to go through, but not their bodies. Trying to pull back, the fish are caught and held fast by their gill covers.

Mackerel usually appear off the coast between Cape Hatteras and Chesapeake Bay sometime between the last of March and the middle of April. Then, they slowly move northward along the coast to Nova Scotia. Boats from various ports go out to meet and catch the mackerel. At one time, before refrigerated holds were common on fishing vessels, many of the large catches of mackerel were split and salted on board to preserve them.

**Tuna.** Tuna fish account for about half the total value of seafood canned in the United States each year. Tuna are large fish caught mainly off the coast of southern California and Baja California in Mexico. They also are caught off the northeastern coast of the United States when they travel northward during the summer. Eastern fishermen often call them "horse mackerel." Because of the size and weight of tuna fish, which is sometimes several hundred pounds, they usually are caught on lines rather than in nets. Most of the tuna catch is canned. Los Angeles and San Diego are leading centers for this industry.

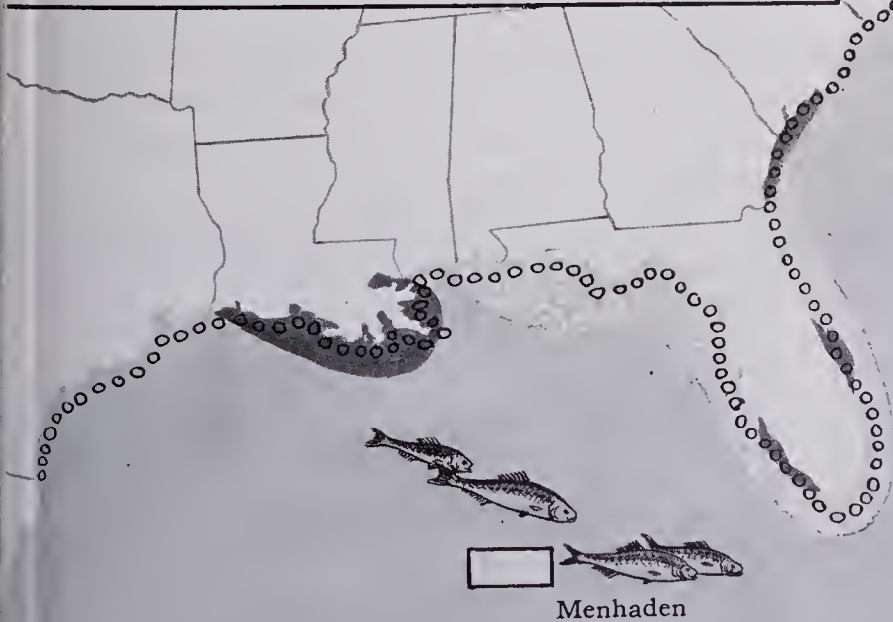
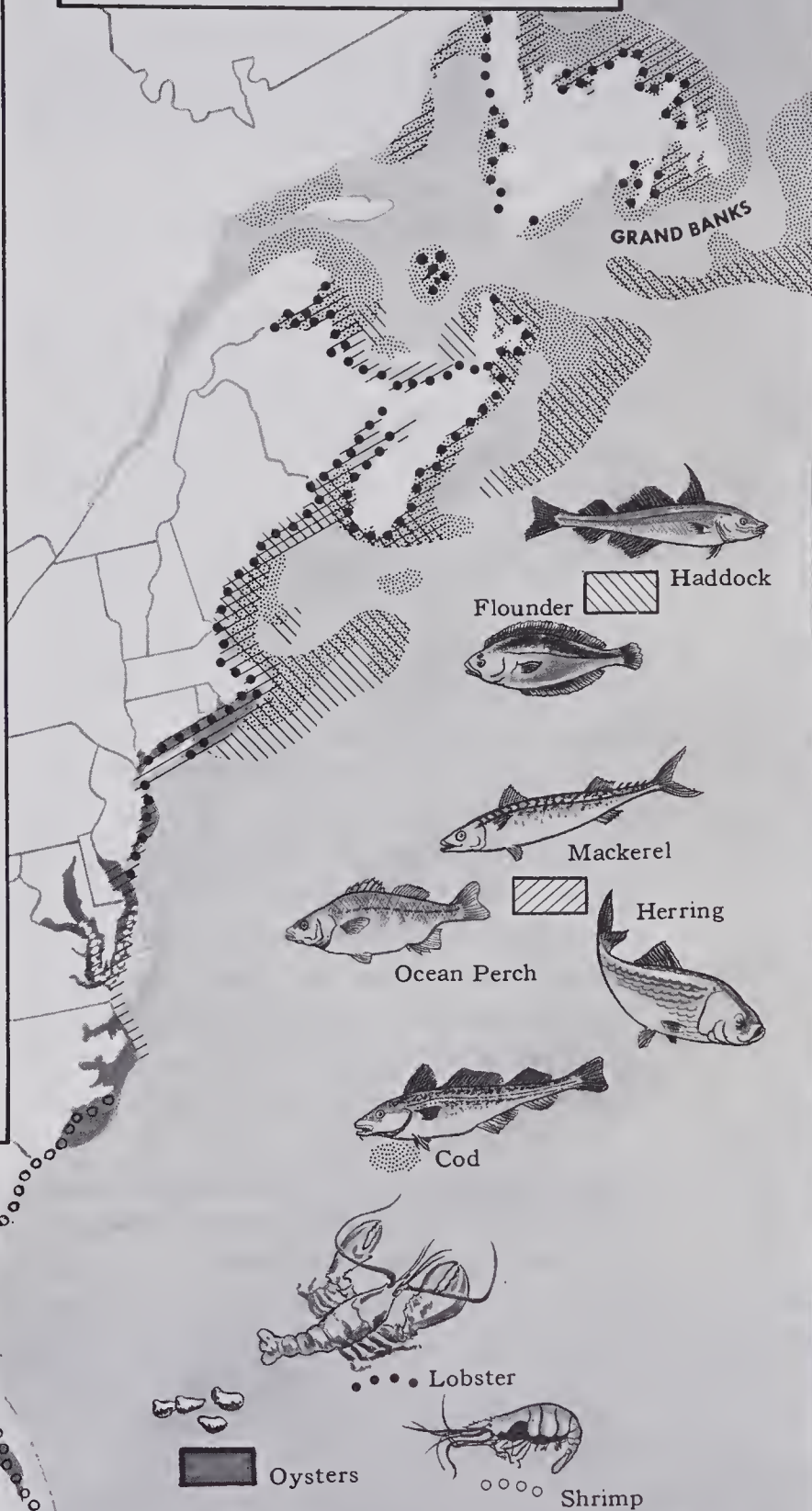


**Salmon Fishing.** Salmon are found along the Pacific Coast from northern California to Alaska. They are caught not only in the waters off the coast, but also in the rivers flowing to the ocean. In the United States, the lower Columbia River, the Puget Sound district, and Alaska are the leading salmon-catching areas. Salmon are canned, frozen, smoked, salted, or sold fresh.

As with other fish, the habits of the salmon determine the methods used by commercial fishermen in catching them. Salmon are hatched in shallow streams or lakes, often several hundred miles from the ocean. The young salmon swim and feed together in schools. When they reach a length of two or three inches, they swim downstream to the ocean. There, they live for several years increasing in size until they are fully grown, at which time they weigh from four to twenty-five pounds. Then they return to fresh water for the purpose of laying their eggs which is called **spawning**. Fighting their way upstream against the current, struggling through rapids and leaping small waterfalls, they finally reach shallow water where they spawn. During the entire journey, which

Find the areas on these two maps where large numbers of ground fish gather to feed. Near which coasts of the United States would you be most likely to catch a "horse mackerel"?

# FISHING GROUNDS IN THE UNITED STATES AND CANADA



## ATLANTIC COAST FISHING GROUNDS

0 300  
Scale of statute miles





These fishermen have found a school of tuna. Why are they using rods instead of nets?

may take many weeks and cover a distance of fifteen hundred miles, the salmon touch no food. They die soon after spawning.

As the salmon travel in schools upriver to spawn it is possible to catch great numbers of them in nets. Traps of various kinds are used to catch the salmon. Because of dams in streams and over-fishing, the number of salmon has been declining. As a result, the catch of this delicious fish is no longer as large as it once was.

The salmon fishing season varies somewhat with the locality, but it extends roughly from late in the spring into September. The time and the length of the season are determined in all cases by the run of the fish to the spawning regions. People who are employed in catching the salmon or canning them are engaged, therefore, in a seasonal business.

Shown drying are gill nets used in snaring salmon in the Columbia River. Their mesh permits undersized fish to escape.



This woman in a California cannery is feeding tuna meat into a chopping machine.

**Oysters.** Natural oyster beds were found along the Atlantic Coast when the first settlers arrived. Since colonial times, additional beds have been located or planted, and now every coastal state except Maine, New Hampshire, and Alaska has an oyster industry. The greatest centers for the industry are Chesapeake Bay, the Louisiana Coast, and Puget Sound in Washington. Leading states in oyster production include Virginia, Maryland, Washington, Louisiana, and New Jersey.

Oysters are not found in the open sea, but in partly closed waters such as bays and river mouths. Moderate temperature and freedom from mud and shifting sand are important for their successful growth. The water should not get colder than freezing and it should reach sixty-eight degrees or more for part of the year. Oysters grow more rapidly in warmer water and usually require from two to four years to reach market size. Very few oysters live to attain full growth, as they are eaten by starfish, sponges, and snails.

Young oysters have many enemies in the sea, but man, by too much fishing, has been the greatest enemy of the oyster. In order to maintain the supply, oyster "farming" has been developed. Suitable beds are strewn with oyster shells and stones so that tiny young oysters, in the swimming stage of their growth, will have a good place to



attach themselves. Sometimes young oysters called **seed oysters** are taken from other beds and "planted" in the prepared area. They drop down to the bed, and are permitted to grow until sufficiently large for market. In a number of states, suitable oyster ground is surveyed, laid out in plots, and rented to oystermen.

At "harvest" time, oysters usually are scooped up from shallow water with long tongs which have ends like baskets. In deeper water, a dredge drags a net scoop slowly along the oyster beds. When full, the scoop is hauled in and emptied into the boat. After being landed, oysters are prepared for market in several ways. Some are packed in ice and shipped fresh. Others are **shucked** and then packed in ice or canned. Shucking consists of opening the oyster shell and removing the meat. The shells, also, are an important product of the oyster industry. They are used for making oyster beds, for making lime that is used as fertilizer, and for poultry grit.

**Lobsters.** Lobsters are one of the most valuable seafood products of New England; many also are caught off the coast of California. Leading states in supplying lobsters are Maine, Massachusetts, California, New Jersey, and New Hampshire. Many more lobsters are caught in Maine than in all the other states combined.

Lobsters are caught in box-like traps

The lobster catch is an important source of income to fishermen in York Harbor, Maine. Note the lobster pots on the pier.



These men are shelling scallops on a dredger off the Massachusetts coast.

called lobster pots, which are lowered to the sea bottom where the lobsters feed. Bait is placed inside the pots. The lobster finds its way inside the pot, but cannot get out again.

Lobsters once were so plentiful that they sold for as little as a penny apiece. Now so few are caught that they are considered a luxury. You may have seen lobsters alive in city markets for they are shipped alive, packed in containers with ice and seaweed. For short distances, such as from Maine to New York City, lobsters are shipped mostly by rail or truck. Many are sent by air freight to cities thousands of miles from the Maine Coast.

**Shrimp.** One of the most valuable catches of fishermen in the United States is shrimp. These little sea animals are found in the waters off every coastal state.

The bag-shaped net being emptied here is a shrimp trawl. The shrimp will be packed in ice to keep them fresh.





The main shrimp-fishing areas, however, are along the Gulf Coast and the Atlantic Coast from North Carolina southward. Leading states in shrimp production are Louisiana, Texas, and Florida.

Most shrimp are caught by approximately the same methods used to catch ground fish. After the nets are dumped onto the shrimp boat, the shrimp are beheaded and packed in ice. Later they are cleaned, packaged, and frozen or canned.

**Other Large Catches.** The little fish called sardines, which are members of the herring family, usually are found in larger quantities than other kinds of fish. They wander about in schools from place to place in the ocean. As a result, fishermen are never sure of a good catch. Off the coast of Maine, young herring are caught and canned as sardines. The Pacific Coast is the leading sardine fishing area, however. Monterey is the most noted center for canning sardines, but many also are canned in Los Angeles.

Halibut are caught in both Atlantic and Pacific waters, but they are most plentiful in the Pacific. Halibut, like tuna, are large; but unlike tuna, they commonly are marketed fresh or frozen. Halibut are cleaned and iced on the fishing vessel. When they reach port, they are iced or frozen for further shipment. Halibut have become

scarce in Atlantic waters, and most of the supply now comes from the northern Pacific. Seattle is the main center for packing and shipping halibut.

## QUESTION BOX

44

1. What are ground fish? How are they usually caught?
2. What differences are there between a seine and a gill net?
3. Where are most of the tuna fish caught? Why are they mostly caught on lines rather than in nets?
4. Where in the United States are most of the salmon caught?
5. Why are many salmon caught in fresh water rather than salt water?
6. Why has the supply of salmon decreased in recent years?
7. Under what conditions do oysters grow best?
8. In what ways are oysters prepared for the market?
9. Which state leads all other states in its lobster catch?
10. Where are the main shrimp-fishing areas?
11. Why are fishermen never sure of a good sardine catch?



These men are unloading a catch of fish on a pier in Boston. The fish are taken from holds on the ship and put into crates. Because fish are very perishable, they must be transferred from the ships quickly.





Electrical and industrial machinery worth more than three billion dollars is shipped each year from ports in the United States.

## TRADE AND COMMERCE

The people of the United States carry on a vast amount of **domestic commerce**, which is business carried on within the country itself. In the United States, domestic commerce amounts to billions of dollars each year and is far greater than that within any other country. Why should there be such a vast amount of trade within the United States? Try to give some reasons for this before you read further.

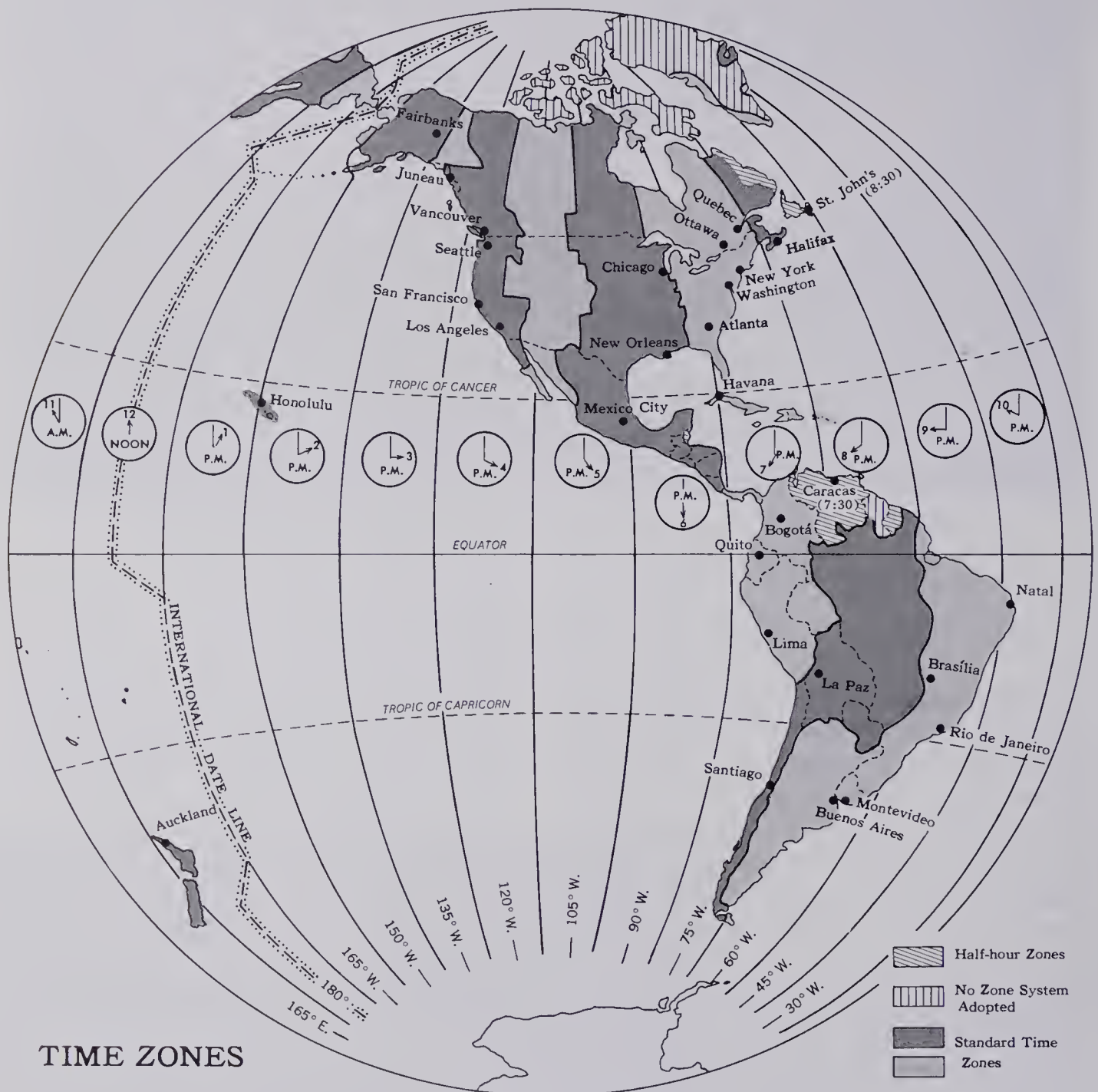
**Division of Labor.** One of the most important reasons for domestic trade and commerce is the **division of labor**. This term means that certain groups of people do specialized kinds of work. Several different ways of earning a living, such as agriculture, manufacturing, and fishing,

have been described. Within each one of these fields there are many kinds of occupations, so that one person may do just one task for a living. For this one task, he receives money with which he purchases the necessities, and often the luxuries, of life. Thus the division of labor leads to the exchange of goods and services.

**Advertising and Credit.** Another reason for the level of business within the United States is the ever-increasing wants of the people. Such needs as food, clothing, shelter, tools, fuel, means of transportation, and means of communication are universal among all people. The ways of obtaining such needs, and the quality of the products which satisfy these needs, depend on



Most time zones are spaced at equal intervals parallel to the prime meridian. They are not exactly followed, however, when they would divide a heavily populated area and cause confusion within a city. Notice how some of the time zones in South America follow the borders of the countries. There is little need for time zones in areas with few people and no trade or commerce.



TIME ZONES





This office in Wisconsin was designed by the famous architect, Frank L. Wright.

many factors. No other country has developed or uses advertising to such an extent as the United States. Advertising is used, basically, to make the people want more things and better things. To obtain them, people are encouraged to work hard and spend their wages or profits. Of course, high wages, machine production of goods, and other forces also have been partly responsible for increasing the wants of the people.

The extension of credit also helps stimulate business. People are encouraged to buy goods and pay for them over a period of weeks, months, or years. When people buy automobiles, television sets, refrigerators, and similar luxury items, other people are kept employed. Partly because of advertising and credit, the luxuries of past generations are now regarded as necessities in the United States.

As more and more people have nicely furnished homes, the standard of living rises. The desire to improve one's standard of living is one of the strongest driving forces in the world. Every person wants to eat, dress, and enjoy life as well as he can. The standard of living in the United States is higher than that in any other large nation. In almost all ways, the average American family now lives much better than kings did only a few hundred years ago!



Ideas on how to advertise a product are being discussed here over a drawing board.



*Above.* The United States is rapidly becoming a nation of homeowners. Many young couples use credit to finance their homes. *Below.* Good housing and short working hours make it possible for many people to enjoy their homes and families.







Soil and climate differences in the United States make possible a great variety of agricultural products. Each of the pictures above were taken during the spring. Which states could be having the kind of weather shown?

**Differences within the Country Result in Commerce.** A great volume of commerce would not be possible within a small country. The United States is a large country of 3,615,206 square miles, occupied by about 195,000,000 people. Within such a large territory, as you have learned, there are many differences in climate, topography, soils, and the distribution of forest and mineral resources. There are also many differences in industrial development, density of population, and available water supply. Each of these will be briefly discussed in relation to its effect on domestic commerce.

**(1) Differences in Climate.** As you have already learned, a considerable amount of trade is created because of the various kinds of crops which can be grown in the United States. Citrus fruits are shipped from Florida, California, and Texas to other states. Sugar and pineapples are shipped from Hawaii to the mainland. Potatoes are shipped from Maine and Idaho. Cotton is shipped from the South to the North. Can you give some other examples to indicate how differences in climate in the United States help stimulate domestic commerce?

**(2) Differences in Topography.** Some places in the United States are located near an ocean at sea level; some places are located high in the mountains. Other places are located on large, swift-moving streams where water power can be utilized. Such different locations encourage development of different ways of living and different industries. Many manufacturing, agricultural, transportation, and tourist industries are based on such differences in topography. If these differences were not so great or so varied, less domestic commerce probably would result.

**(3) Differences in Soil.** Vast differences in soils exist from place to place in the United States. On the Atlantic and Gulf Coastal Plain, the soil is sandy. In the Corn Belt, by contrast, the soil contains large amounts of silt and humus which make it valuable, fertile farmland. In many mountainous areas of the country, the soil is rocky; in other areas, it is largely clay. The nature of the soil, in spite of extensive use of fertilizers, determines in part what the land will produce. Such differences in the products or crops that can be raised in one region in contrast to another help to stimulate an exchange of goods.



(4) **Unequal Distribution of Forests.** As we have learned, forests are not evenly spread across the United States. Lumber must be transported to the Prairie States from regions with greater rainfall. Furniture made from hardwoods is needed in areas where hardwoods do not grow. Commerce between various parts of the country naturally results.

(5) **Unequal Distribution of Minerals.** The mineral resources of our country are vast but unequally distributed. Some states have coal, others do not. Some states have petroleum, while others have none. In some states in which mining is a principal occupation, the people depend on other states for other necessities and luxuries. Thus, differences in the distribution of mineral resources help to create domestic commerce.

(6) **Differences in Industrial Development.** Differences in the extent of industrial development from place to place help stimulate trade. For various reasons, the New England States became a major manufacturing region many years ago. Many of the raw materials needed in New England factories, however, have to be imported from other states. The South furnishes raw cotton for the cotton mills.

Most beef cattle are grazed in areas far from the major consuming centers. Many are shipped to the Corn Belt for fattening.

Minnesota and other North Central States supply the New England States with wheat and flour. Montana and other western states furnish the raw wool needed by woolen mills. Steel needed for metalware manufacturing comes from Pennsylvania or another steel-manufacturing state. The New England States, in turn, send to these regions their finished products including cotton and woolen clothing, boots and shoes, firearms, hardware, and many other useful articles.

(7) **Unequal Distribution of Population.** As the map on page 204 shows, the population of the United States is very unequally distributed. Some states or regions are densely populated, while others have few people per square mile. The regions with only a few people usually produce raw materials and food, while the heavily populated sections produce manufactured goods. These conditions bring about an exchange of products, and this results in more trade and commerce.

(8) **Available Water Supply.** Water is necessary for all plant and animal life. Modern man uses quantities of water which would be unbelievable to any person living in a primitive culture. Manufacturing plants use tremendous quantities

When meat finally reaches a consuming center, it is distributed to local markets. There it will be cut, weighed, and packaged.

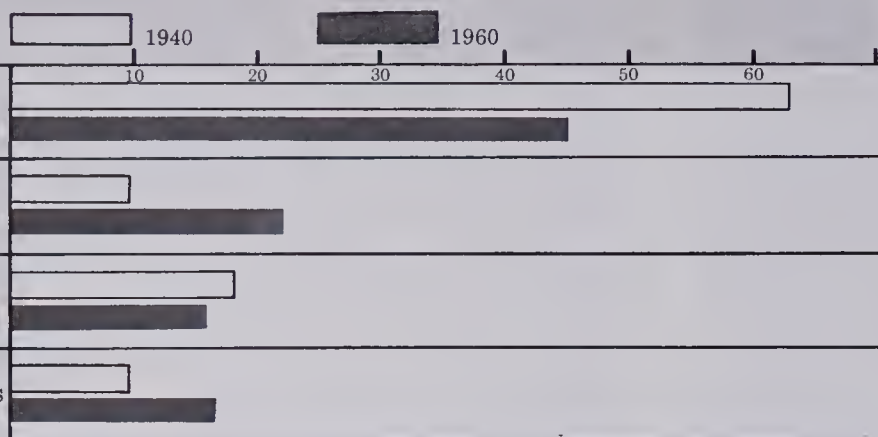




## DOMESTIC CARGO CARRIED BY TYPE OF TRANSPORTATION:

1940 AND 1960

(BY PERCENT OF TOTAL VOLUME)\*



\*Percentages are approximates.

In recent years, trucks have been carrying an increasingly larger percentage of freight. Between 1940 and 1960 many pipelines were built to carry oil from oil fields and refineries to the industrial centers where large amounts of oil are used.

of fresh water; for this reason, many plants have been built near the Great Lakes. Water usage is growing rapidly in the United States. In 1900, the nation was using about 40 billion gallons a day. By 1920, it was using about 90 billion gallons a day, and by 1940, 135 billion gallons. In 1960, the daily use of water exceeded 320 billion gallons! Predictions are that by 1980, the United States will use each day about 500 billion gallons of water. Unequal distribution of water results in domestic commerce, because crops and manufactured goods are largely produced where water supplies are adequate.

**Free Trade among States.** Another reason for the growth of domestic commerce in the United States is that **free trade** exists among states. Free trade is trade without tariffs or taxes charged by one state or

Trucks carry goods rapidly and freely from one state to another on highways.

country on goods produced elsewhere. Until recently, trade among countries in Europe was hindered by tariffs, in contrast to domestic commerce in the United States. Now, two economic blocs have been developed in Europe to eliminate tariffs and stimulate free trade. In time, a United States of Western Europe may result. For almost 200 years, the people of the United States have benefited from free trade and a single monetary system.

**Rapid Transportation.** Perhaps no factor has been more responsible for the growth of domestic commerce than the development of rapid means of transportation.

(1) **Waterways.** Waterways were the first transportation lines to be used regularly. Before the colonists knew how to build roads and railroads, they moved their goods on natural waterways. Until the middle of the nineteenth century, steamboats on the numerous rivers and lakes were the major carriers in commerce.

There are still thousands of miles of navigable waterways, and also a long coast line, in the United States. Among the more important waterways are the Great Lakes and the St. Lawrence Seaway. The Seaway connects the world's finest body of interior waterways with the Atlantic Ocean. At the terminals of the Seaway, special facilities make possible rapid loading and unloading of cargoes. Many of the vessels on the Great Lakes today are especially designed to transport bulk goods such as







The map shows the major shipping routes of the Great Lakes. Why are these shipping routes so important to industries that make iron and steel? The tug shown above is pushing an ore boat from a dock in Minnesota.



iron ore, grain, and coal. Because of the large volume of bulk cargo, shipping rates are low. These ships are among the most efficient carriers in the world.

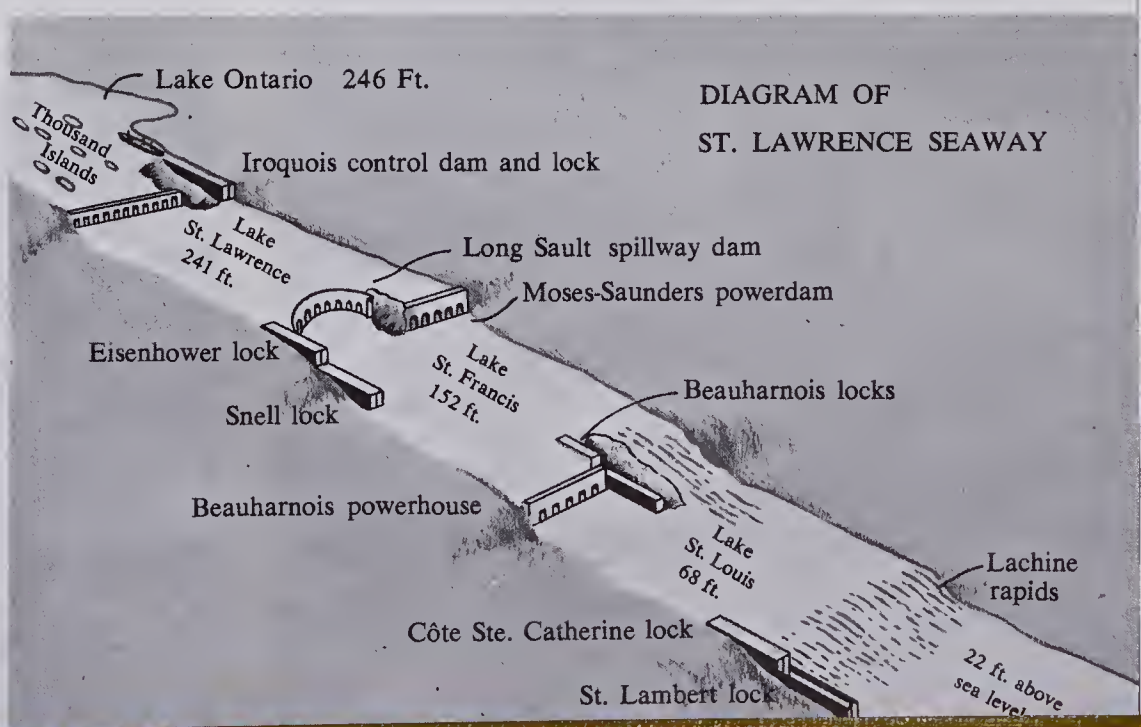
Many improvements in other inland waterways have been made in recent years. Canals connect the Great Lakes with the Mississippi and Hudson Rivers. Many dams with locks also have been built in some of the principal river valleys. These make it possible to raise the water level to overcome rapids, store up water, and regulate the flow of water, making the rivers navigable throughout the year. The Mississippi River now has a nine-foot-deep channel as far north as St. Paul and Minneapolis. The Missouri has a similar channel as far as Kansas City, and the Ohio has one for

its entire length. The Tennessee and Cumberland Rivers are navigable for barge traffic as far as Knoxville and Nashville. At present a new canal is being dug across Florida to join the Atlantic and Gulf Intracoastal Waterways. Then small boats can go safely from Massachusetts to Texas.

(2) **Railroads.** Many waterways once used in commerce are no longer extensively used because other means of transportation have been developed. The growth of railroads was the main reason for the declining use of waterways. There are several reasons why railroads grew in importance.

First, a railroad can be built from an area where raw materials are obtained to an industrial center. Numerous branch

The locks in this section of the St. Lawrence Seaway lift ships from the river to the level of Lake Ontario, 246 feet above sea level. The ore carrier below is going into a dry dock for repairs.







A lock on the St. Lawrence Seaway. All seaway locks are 766 feet long and 80 feet wide. Channels between locks are 27 feet deep.

lines can also be constructed to form a network of rail lines. Waterways, by contrast, generally must follow courses determined by nature.

Second, trains run considerably faster than boats, especially when the boats are on narrow, winding waterways. Fast freight trains travel about sixty miles an hour. Large cargo ships can travel fifteen to twenty miles per hour, but the speed of canal boats is less than four miles per hour.

Third, waterways freeze over during the

Trains are switched by electronic equipment at this modern freight yard in Tennessee.



winter months in the northern part of the United States. The Great Lakes and the St. Lawrence Seaway are closed for several months each winter. Railroads, on the other hand, offer regular service throughout the year. Heavy snows, ice, and extreme cold may cause some delay in railroad service, but the trains are never stopped for long.

The United States has about 217,000 miles of railroads. This amount is more than one-fourth of the railroad mileage of the entire world. The first rail lines were very crude, but many improvements have been made since then. In the early days, there was no standard gauge. Today, the gauge has been so well standardized that cars may be moved from one railroad to another anywhere in the country. Mexico and Canada also use tracks that are of the same gauge.

You have seen the names of many different railroad companies on the cars of a freight train. Often, a freight car belonging to one railroad is loaded at a factory, and then sent over the lines of another railroad to its destination. The cars belonging to any one railroad, therefore, may be found all over the country at any one time.

(3) **Highways.** For many years, the highway system in the United States has been an important factor in domestic trade.

Notice the many kinds of equipment used in preparing the roadbed for a new highway.







Modern highway systems such as this one speed the nation's ever-increasing traffic.

The first roads were mostly Indian trails which followed the river valleys and the topography of the land. These early Indian trails became traders' routes over which explorers and pioneers carried their supplies on horseback or in wagons. Much later, many of these traders' paths were paved to make good roads. Roads or highways now reach every community of any size in the country. Buses and trucks provide rapid transportation to most communities, including those which are not served by railroads.

The enormous increase in the number of automobiles and trucks has greatly stimulated road building in this country. As a matter of fact, an entire industry now specializes in building earth-moving equipment. Most of this equipment is used to build new highways across the land.

(4) **Airlines.** The newest and most rapid way of transporting people and goods is the airplane. Airways connect all leading cities in the nation. In a recent year, about 71 million passengers flew more than 50 billion passenger miles within the United States. Mail and much valuable cargo also are carried to all sections of the country and to many foreign countries by commercial airlines. Helicopters are now used in New York, Chicago, and Los Angeles to carry mail from the central post office to branch offices. The speed at which airlines



Large quantities of fuel are consumed each year in commercial and military airplanes.

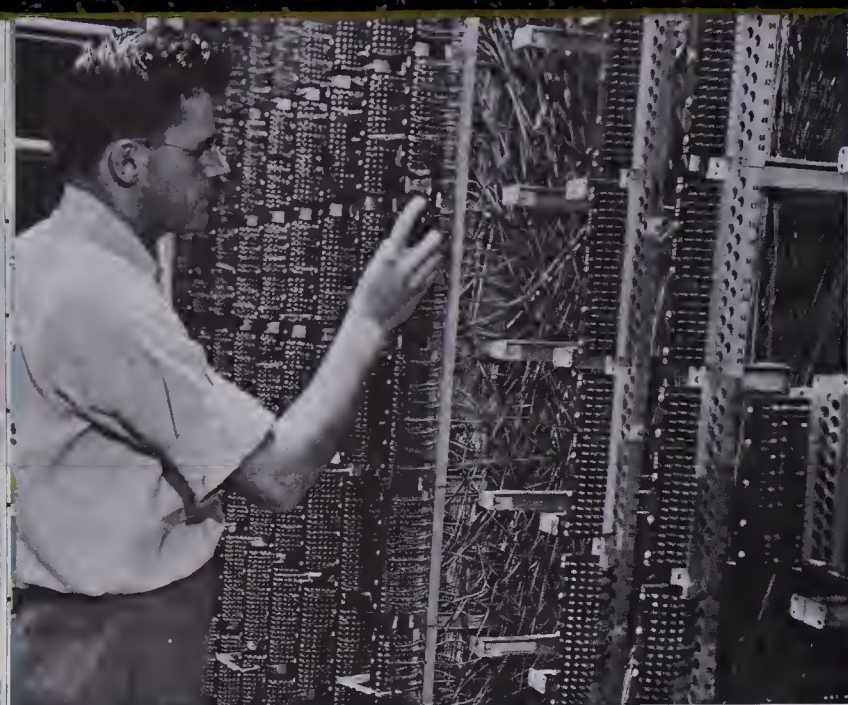
carry goods and passengers has greatly aided the growth of domestic commerce.

In addition to providing regular transportation, airplanes are used in many special ways. In time of disasters, such as floods and earthquakes, aid can be quickly flown to the people in need. Medicine and supplies can be dropped by parachute to places where they are needed. Exploration, photography, and mapping are now done from the air. Forest fires are spotted, and fire fighters and equipment are quickly flown to the danger area. Many crops are sprayed with insecticides, and rice fields are planted from the air.

**Helicopters** carry mail and passengers. They also assist in construction and rescue work.





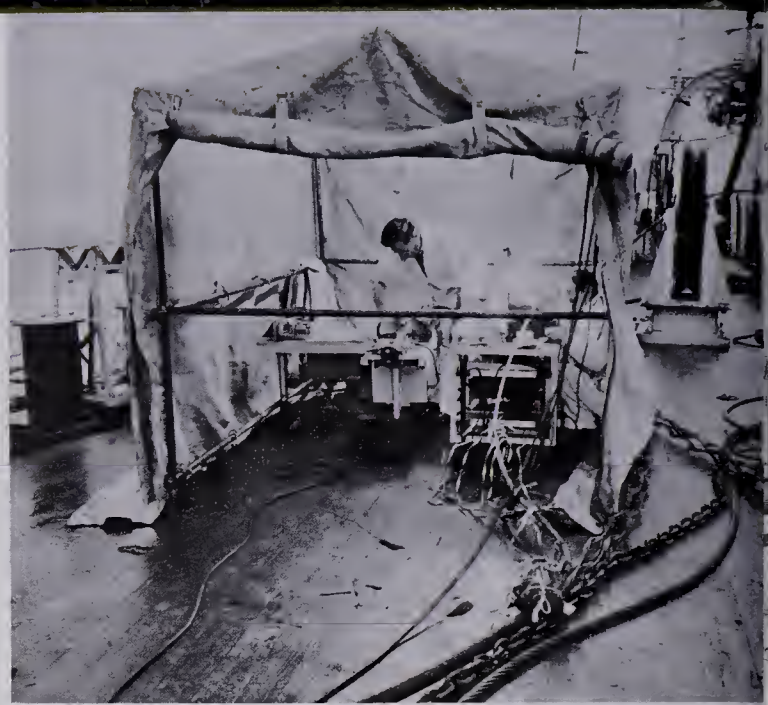


The use of dial telephones has reduced the time needed in placing many calls. Many men are needed to test and maintain equipment.

**Rapid Communication.** Modern, almost instantaneous communication also has helped to stimulate domestic commerce. Large industrial corporations must have rapid ways of communicating with their parts suppliers and branches in many sections of the country. Businesses which handle perishable goods, such as flowers or fruit, must also have ways of transmitting messages instantly. The United States is tied together in a vast communications network. Telephone lines extend to almost every little hamlet. Major trunk lines provide telephone service between all large centers of population. In addition, very rapid telegraph service is available in most cities.

The communications network has been extended, moreover, to other countries. Submarine telegraph cables extend to all parts of the world, and telephone cables to Europe, Hawaii, and Japan. Messages can also be sent or phoned almost any distance by use of radio. Such developments encourage trade and commerce with people who live in other nations.

**International Trade.** Although the United States is one of the world's major trading nations, the volume of its foreign



The crew aboard this ship is making the splice which completed the 2,400 mile underwater Hawaiian Cable.

trade is small when compared to its domestic commerce. Nevertheless, overseas trade is immensely important because export markets for surplus goods are needed, and many needed materials and supplies are obtained from other countries. Many people in the United States would no longer be employed if international trade ceased.

Manufactured products from the United States may now be found in almost all parts of the world. The leading export of the United States is machinery. Electrical and industrial machinery worth more than four billion dollars is sold to other lands each year. Other important exports are wheat and other grains, automobiles and trucks, airplanes, textiles, chemical products, coal and petroleum, rubber and rubber products, and tobacco.

Attempts are constantly being made to increase this export trade. Many companies have sales representatives in other countries. Schools of foreign commerce have been established in which interested people may study the languages, customs, needs, and desires of other peoples. In recent years, however, Japan, West Germany, and several other nations have been selling





*Left.* A large piece of roadbuilding equipment is being loaded on a carrier in New Orleans for shipment overseas. *Right.* This road scraper from the United States is used to build roads in a sugar cane field in Puerto Rico.

products similar to those of the United States at lower prices. This is possible because, in many countries, wage levels are considerably below those in the United States and products can be manufactured at lower costs. Competition for world markets will undoubtedly continue. If the United States is not able to maintain or improve its present level of foreign sales, however, the standard of living in the country may be lowered.

Two kinds of service in transporting goods between countries are provided by ocean carriers. One type is offered by "chartered" or "tramp" vessels, which are usually owned by individuals. These vessels will go to any part of the world, and do not have definite routes or schedules. Passengers who sail on chartered vessels are not certain when a port will be reached. The other type of service is provided by "line" carriers, which run on regular schedules between certain places. You probably have heard of many of these lines. The line carriers are best developed on the most traveled shipping route, the North Atlantic. One disadvantage of line carriers is that they must travel on schedule whether or not they have a full load.

## QUESTION BOX

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1. What are several reasons why the United States has such a vast amount of domestic commerce?
2. What is meant by "division of labor"?
3. What differences exist within the United States which stimulate domestic commerce? Can you think of any not mentioned in the text?
4. What is meant by free trade? How does it stimulate domestic commerce?
5. Which means of transportation developed first in the United States? Which developed most recently? Which probably is used to move the greatest amount of goods today?
6. What differences is the St. Lawrence Seaway likely to make in cities such as Duluth, Milwaukee, and Chicago?
7. What probably would happen to the standard of living in the United States if export markets were lost or greatly lowered?
8. What is the difference between "tramp" and "line" ships?





View of a classroom built in recent years. Do you know what subject the students might be studying in this classroom?

## OTHER OCCUPATIONS

In addition to the major industries already discussed, other occupations are essential in a modern industrial society. Among the more important of these are the professions of medicine, law, and education. Many important service organizations care for tourists, offer personal services such as laundry and cleaning, and

provide entertainment and recreation. Another very important service occupation is providing repair service for all the machines owned by people in the United States. As the population increases in the United States, the demand for the services performed by people in such occupations will continue to grow.

The children here are being examined at school. Preventative medicine is an important part of the work done by the medical profession.





**The Medical Profession.** In the United States more than 260,000 physicians, almost 105,000 dentists, and about 500,000 nurses work to maintain and improve the health of the people. In a recent year, more than 22 billion dollars was spent by people in the United States to pay physicians, dentists, and hospital costs, buy medicines, and pay for other medical services. Millions of dollars are collected and spent each year, also, on medical research. There are almost 7,000 hospitals in the country. Together, these hospitals have space for more than one and one-half million people at any time.

A great deal of time and effort obviously is spent in keeping people healthy and strong. Pure water supplies are available and food is safe to eat almost everywhere in the country. Emergency medical care can be obtained when needed. Many marvelous drugs and vaccines have been developed to prevent diseases such as smallpox and polio. Living in large cities would not be possible without the medical profession, for diseases would sweep through the city and cause many deaths.

Nevertheless, more needs to be done. The population of the United States is growing rapidly, and more physicians, dentists, and nurses are needed. Many people do not take measures to ensure good health and safety. Some people in the United States get too little exercise, eat too many sweet foods, and are influenced by advertised health fads. Many people are killed and injured each year by automobiles and other machines. Many persons also are killed or badly injured by fires and floods.

**The Legal Profession.** Another important profession in this large nation with its complicated way of living is the legal profession. More than 285,000 lawyers try to maintain just, humane relationships between individuals, companies, and levels of government.

Many lawyers are needed in a modern industrial society because so many opportunities exist for disputes to arise. For instance, if an automobile accident occurs in which a person is badly injured, help from lawyers often is needed. Both drivers may have carried insurance to protect themselves against such an emergency. Lawyers must decide which insurance company should pay the hospital costs and other damages. If a new superhighway or freeway is to be built through a city, land must be purchased from the owners. Lawyers must determine how much money should be paid for the land. If several large companies lower prices for awhile in a certain area, small companies may lose money because they cannot afford to meet the lower prices. Lawyers may try to prove that such practices are unfair. Lawyers also work with national, state, and local governments to protect the rights of the people as guaranteed in the Constitution. Many lawyers work actively in politics, helping to elect persons to Congress or actually running for office themselves. Without the legal profession, people in the United States would not enjoy the freedom which is theirs.

**The Teaching Profession.** More than 48 million people — boys, girls, and adults — are enrolled in the schools and colleges of the United States. Of these students, almost 33 million are enrolled in elementary schools. Another 12 million attend secondary schools, and the rest are in colleges and universities. Almost 2,000,000 people in the teaching profession provide learning opportunities for all these students. Teachers attempt to keep up with the latest developments in the United States and the world because conditions are changing so rapidly. They try to help their students learn how to read, write, and figure. They also guide them in learning more about wise use of the earth's resources and





The marketing of skills and services is as important in our society as the marketing of consumer goods. These pictures show a few of the ways in which the skills of our citizens are employed.

A professional golfer gives lessons to children. Draftsmen make careful drawings for engineers to follow. A Shakespearean play is filmed for television. A young pianist gives a concert.



Skilled technicians are needed as the machines and appliances we use become more complex. *Bottom left.* The panel board of a computer.





in achieving better understanding of other peoples and places. Most important of all, teachers try to help students learn how to study and to think, so that they will be well-informed, thoughtful citizens.

At one time, in the early days of the United States, most youngsters received their education from their parents. In a modern industrial society, however, the education of youngsters largely determines the future of the country. At the present time, about 23 billion dollars is spent each year in the United States to educate young people in schools and colleges. Even that huge amount of money is not enough to make sure that every child has good learning opportunities. Many schools are still poorly equipped, and some areas do not have enough teachers.

**The Tourist Business.** One of the nation's largest service occupations is caring for people who are away from home. Many of these travelers are tourists; many are men and women who are attending business meetings or visiting branch factories. In a recent year, there were almost 90,000 places in which travelers could stay, including hotels, motels, and trailer parks. These establishments collected almost four billion dollars in rates! Certainly caring for people who are away from home is a big business!

Most large hotels are located near the centers of large cities. Large cities also have many motels, but these usually are built on the outskirts of the cities, especially along the main highways. Many motels have been built also in small communities all across the nation, and near tourist attractions such as national parks, mountain playgrounds, and famous beaches. There are today in the United States almost twice as many motels as hotels. About a half-million people work in hotels and motels, providing a home away from home for travelers.

**Personal Services.** Almost a million people in the United States provide personal services. These people work in laundry and cleaning establishments, barber and beauty shops, shoe repair shops, and funeral parlors. More than seven and one-half billion dollars is spent each year for such services; almost half of this amount is spent for laundry and cleaning services. A modern industrial society could not operate effectively without the people who perform such needed jobs. Such services are especially needed by families in which both parents are employed.

**Entertainment and Recreation.** Almost a half-million people in the United States work at motion-picture theaters, bowling alleys, golf courses, and amusement parks. Recreational businesses are growing very rapidly because of the demand for them by people who live in cities and work about 40 hours a week. In a recent year, more than five billion dollars were collected by entertainment businesses, almost half of it by the motion picture industry. As you know, the motion picture industry is very large. Not only does it provide movies for theaters and television, but it also makes many motion pictures for use by schools and colleges.

**Repair Services.** One of the most important service occupations in the United States today is repairing machines. About four billion dollars are spent each year on automobile repairs, and about two and one-half billion dollars more are spent on electrical, jewelry, and furniture repairs. Probably, the repairman most frequently seen in homes today is the television repairman, but washing machines, dryers, furnaces, and other electrical appliances sometimes need service. Almost a half-million people work as repairmen, keeping the useful but complicated machines operating. Repairmen perform a very essential service in a nation with so many machines and gadgets.





In the foreground are the United Nations buildings in New York City. The General Assembly meets in the low, domed building.

## THE UNITED STATES AND THE WORLD

Since World War I, the United States has been one of the leading industrial and commercial nations of the world. Since World War II, it has been *the* most powerful democratic nation. Its farms and factories operate so efficiently that no other nation yet challenges the United States in over-all productivity or production per capita. World leadership in science and technology was achieved in the United States while the people enjoyed freedom and justice under law. Other nations also have moved rapidly toward a high standard of living through the use of science and technology. Several of them, such as Canada, Great Britain, and France, also have used democratic means to achieve their goals.

Two of the largest nations in the world, however, the Union of Soviet Socialist Republics and the People's Republic of China, have proceeded differently. In both nations, power was seized by the Communist Party which then ruthlessly destroyed all other parties. People who openly dis-

agreed with the teachings of the Communist Party were killed or sent to work camps in remote sections of the countries. The Communist Party has controlled the U.S.S.R. since the end of World War I and China since the close of World War II. In both countries much progress has been made in manufacturing, especially in the heavy, basic industries such as iron and steel. This achievement has been made largely at the expense of the people's welfare, however, and living standards have been kept low. As a result, the rate of industrial production in the Soviet Union grew for awhile considerably faster than it did in the U.S.A. For a few years it looked as if the U.S.S.R. might equal the industrial production of the U.S.A. by 1975. Recently, though, productivity in the U.S.S.R. has slowed, while industrial production in the U.S.A. has zoomed ahead.

In both the U.S.S.R. and China, moreover, agricultural progress has been much harder to achieve. Large areas of the land in



both countries receive too little rainfall for good crops to grow without irrigation. Several enormous irrigation projects have been completed in the Soviet Union, and others are being constructed in both countries. In China, flood-control projects also are needed, because typhoons frequently strike coastal areas in China causing floods and great damage to crops and homes.

Today, both the democratic nations and the nations under Communism are attempting to convince the rest of the world that their way of life is better. This struggle usually is termed the "Cold War." Both camps in the "Cold War" are concentrating much of their attention on Latin America and Africa — areas where the standard of living is low. Why may people with a low standard of living be easily influenced?

The communist-controlled nations are using propaganda effectively, but they also are furnishing loans, equipment, and scientists to help struggling nations achieve better living standards. The democratic nations also furnish loans and technical aid to these countries. At the same time, they try to convince the people that they will enjoy more freedom and opportunity under a democratic government than under communism. The outcome of this struggle for world influence is of great importance.

The S.S. *Hope*, formerly a Navy hospital ship, has been made into a medical training vessel for service in Southeast Asia.



The United States provides grants and loans to many countries for military aid, technical assistance, and agricultural programs. This money has been provided under several programs by the United States, but recently these have been merged into the Agency for International Development in the State Department. Several private, non-profit organizations, such as CARE and religious groups, also send food, clothing, and tools overseas.

At present, the United States is trying to help strengthen the influence of the United Nations as an instrument of world peace. Several agencies of the United Nations now provide food and medical care for needy peoples. At the headquarters of the United Nations in New York City, representatives of both camps in the "Cold War" discuss the issues that divide them. Each side tries to influence the uncommitted nations to agree with it on important issues. At present, most of the uncommitted nations usually support the position on international problems taken by the United States, or refrain from voting. The voting strength of the Communist bloc has been growing, however. If the Soviet Union and China convince enough other nations that their way of life is best, the United States may then be consistently outvoted in the United Nations.

News and information about the Free World is shown being broadcast to people in other lands from a radio station.







The Peace Corps is composed of volunteers who are trained to help people living in under-developed nations in Africa, Latin America, and Asia. More than 10,000 Americans such as the young man here are giving two years of their lives to this cause.

The outcome of this struggle is of importance for trade and friendship as well as world power. Watch for articles in newspapers and magazines which tell what the United States is doing to help Latin American, Asian, and African nations. Look also for articles which describe what the Communist nations are doing. Decisions made and action taken by the United States in the next few years may decide the course of history for decades to come.

Technical assistance for this road shown under construction in Latin America is provided by an agency of the United Nations. How can new roads help under developed nations?



## QUESTION BOX

46

1. Why are more doctors, dentists, and nurses needed in the United States?
2. Why are lawyers especially needed in a modern industrial society? What sort of disputes may arise? (Give an example of one.)
3. About how much each year is spent in educating young people in schools and colleges?
4. Why are the medical, legal, and teaching professions of greater importance in a modern industrial society than in a primitive one?
5. What differences exist between the location of large hotels and motels?
6. What kinds of personal services are provided in your home town or city?
7. Why did the productive capacity of the U.S.S.R. grow for a while more rapidly than that of the United States?
8. Why is the outcome of the "Cold War" so important to every citizen of the world?
9. Why are the uncommitted nations important in the outcome of the "Cold War"?



## GLOBE AND MAP ACTIVITIES

1. Which is farther north: (a) Boston, Massachusetts, or Seattle, Washington? (b) New York City, New York, or San Francisco, California? (c) Key West, Florida, or Honolulu, Hawaii? (d) Anchorage, Alaska, or Juneau, Alaska? (e) Dallas, Texas, or Los Angeles, California? (f) Des Moines, Iowa, or Salt Lake City, Utah?

2. If it is 8:30 A.M. in Hartford, Connecticut, what time is it in: (a) Anchorage, Alaska; (b) Nome, Alaska; (c) Juneau, Alaska; (d) Billings, Montana; (e) Denver, Colorado; (f) New Orleans, Louisiana; (g) Birmingham, Alabama; (h) Salem, Oregon? Figure all times as standard.

3. During which six months of the year do each of the following areas have the greatest amount of rainfall: (a) the Pacific Coast in the Northwest; (b) the Pacific Coast in southern California; (c) southern Florida; (d) the Great Plains; (e) the Gulf Coast; (f) the Sierra Nevada; (g) Minnesota; (h) Ohio?

4. What differences exist in prevailing winds in summer and winter at each of the following places: (a) San Francisco, California; (b) New Orleans, Louisiana; (c) Miami, Florida; (d) Seattle, Washington; (e) New York City; (f) Boston, Massachusetts; (g) Charleston, South Carolina? What generalizations based on the maps can you make about prevailing winds in the coastal areas of the United States?

5. Using the products maps in this unit of the book, answer the following questions: (a) What state raises the most tobacco? How far north is tobacco raised? (b) Which southern state raises the least cotton? Where are the most northern areas in which cotton is grown? (c) Where are the three major peanut-growing areas? (d) In what four states is most of the rice crop grown? (e) In which section of the country—eastern, central, or western—are most beef cattle raised? (f) In what quarter of the country—northwest, southwest, northeast, or southeast—are most milk cows raised? (g) In what quarter of the country is the most hay cut? (h) In what states are less than 10,000 acres of corn planted? (i) In

what states are fewer than 10,000 head of hogs raised? (j) In what states are fewer than 10,000 acres of wheat harvested? In which third of the country is the most wheat threshed? (k) Which third of the country raises the most grapes? The most pears? The most apples? (l) What are the great fruit-growing areas of the nation? (m) Which third of the country raises the most sugar beets? (n) In which state are the most sheep raised? In which part of that state are the most sheep raised? (o) How far north is citrus fruit raised?

6. What is the location in degrees and minutes of each of the following cities: (a) Boise, Idaho; (b) Detroit, Michigan; (c) Atlanta, Georgia; (d) Miami, Florida; (e) Hilo, Hawaii; (f) Barrow, Alaska; (g) Tulsa, Oklahoma; (h) Columbus, Ohio; (i) Washington, D.C.; (j) Philadelphia, Pennsylvania; (k) Denver, Colorado; (l) Santa Barbara, California?

7. Be prepared to locate on a large wall map each of the following: (a) Cumberland Plateau; (b) Adirondack Mountains; (c) White Mountains; (d) Alaska Range; (e) Mauna Kea; (f) Great Plains; (g) Gulf Coastal Plain; (h) Cascade Mountains; (i) Great Basin; (j) Continental Divide; (k) Ozark Plateau; (l) Allegheny Plateau; (m) Edwards Plateau; (n) Great Smoky Mountains; (o) Mesabi Range; (p) Piedmont; (q) Allegheny Mountains; (r) Green Mountains; (s) Colorado Plateau; (t) Uinta Mountains; (u) Columbia-Snake Plateau; (v) Central Valley; (w) Brooks Range; (x) Pearl Harbor; (y) Death Valley; (z) Black Hills.

8. Which cities in the United States, as shown on the map on pages 218-219, have a population of more than 2,000,000?

9. Be prepared to locate on a wall map each of the following rivers: (a) Yukon; (b) Colorado; (c) Missouri; (d) Hudson; (e) Tennessee; (f) Mississippi; (g) Red; (h) Red River of the North; (i) Ohio; (j) St. Lawrence; (k) Platte; (l) Rio Grande; (m) Potomac; (n) Columbia; (o) Snake; (p) Cumberland; (q) Delaware; (r) Fox; (s) Kansas; (t) Arkansas; (u) Allegheny; (v) Connecticut; (w) Wabash; (x) Yazoo; (y) Yellowstone; (z) Tanana.



10. Does any state capital have a population of more than 2,000,000? Which state capitals have a population of more than 500,000?

11. How is the land surrounding each of the following cities principally used: (a) Phoenix, Arizona; (b) Chicago, Illinois; (c) Spokane, Washington; (d) Charleston, West Virginia; (e) Billings, Montana; (f) Kansas City, Kansas; (g) Fort Worth, Texas?

12. In what general direction does each of the following rivers flow? (a) Mississippi; (b) Hudson; (c) Ohio; (d) Rio Grande; (e) Fox; (f) Allegheny; (g) Columbia; (h) St. Lawrence; (i) Yellowstone; (j) Red River of the North; (k) Connecticut; (l) Missouri; (m) Wabash.

13. What states in the United States have land through which the Mississippi River flows?

14. Which part of the United States has the most desert? (a) That east of 90° West Longitude; (b) That between 90° West Longitude and the Rocky Mountains; (c) That between the Rocky Mountains and 120° West Longitude; (d) That west of 120° West Longitude.

15. If you wanted to start a lumber company in four different states, in which of the following states would you buy land? (a) Georgia; (b) Washington; (c) Nevada; (d) Maine; (e) Oregon; (f) Kansas.

16. Name the state capitals which are farthest north, south, east, and west.

## OTHER LEARNING ACTIVITIES

1. Prepare an oral report for presentation to the class on the mining, preparation or smelting, metals obtained, and uses in industry of one of the following minerals: (a) iron ore; (b) bauxite; (c) copper; (d) lead; (e) zinc; (f) gold; (g) silver; (h) nickel; (i) tungsten; (j) uranium; (k) chromite; (l) manganese; (m) mercury; (n) platinum; (o) cobalt; (p) titanium; (q) molybdenum; (r) tin.

2. Join a group to present to the class an illustrated report on "State Capitals and the National Capital." Use the opaque projector, slide projector, filmstrip projector, or motion-picture projector as needed to present your report. You may wish, also, to develop and duplicate for each class member a brief written summary of each capital city. Make sure that the report is not too long.

3. Prepare a written report for the room library on one of the following industries: (a) quarrying stone; (b) glass making; (c) pottery making; (d) milk products; (e) bakery products; (f) paper; (g) cotton textiles; (h) tobacco products; (i) candy products; (j) shoes and boots; (k) lumber products; (l) rugs; (m) furniture; (n) books; (o) magazines; (p) newspapers; (q) fertilizers; (r) soap; (s) luggage; (t) drugs and medicines; (u) products made from salt; (v) concrete; (w) rubber goods; (x) paint; (y) hats; (z) products made from petroleum.

4. Prepare a series of charts in order to show and compare the use made of railroads, trucks, buses, and airplanes in freight and passenger transportation. Comparative figures, that will prove to be very helpful in doing this activity, can be obtained from the *Statistical Abstract of the United States*.

5. Prepare a graph showing the population of the United States at 10-year intervals from 1790 to 1960. Then show what it may be in 1970 and 1980. Figures needed can be obtained from the *Statistical Abstract of the United States*.

6. Join a group to plan an exchange of information with another class of students somewhere in the Western Hemisphere. The Junior National Red Cross may help you locate an interested class somewhere else in the nation or in some other country. Embassies of other countries may be able to help, also. Your tasks will include: (1) Deciding on a preferred state, province, or nation; (2) Attempting to establish communication with the other class; (3) Planning materials and exhibits to send to the other class which will help them learn more about you; (4) Involving other members of your class in preparing materials, including personal letters or autobiographies; (5) Maintaining correspondence through the rest of the year; (6) Deciding how to make the best use of information received from the other class.



7. Join a small group to preview available films and filmstrips about the United States and select those which you believe will be of greatest value to the entire class. Before you begin viewing the visual aids, plan a systematic way of evaluating each film or filmstrip. Discuss your plans with the teacher. Most of your viewing time undoubtedly will have to be scheduled before or after school.

8. Join a small group responsible for developing and maintaining a vocabulary chart. This chart will contain words in Unit 9 which everyone should learn if he does not already know them. You may wish to develop an end-of-unit test to measure how well everyone has learned the meanings of the words which you selected for your charts.

9. Join a small group to keep a bulletin board of news about relationships between the United States and Latin American countries. If important changes take place, be sure to call the attention of the class to the display.

10. Find out all you can about the people who work as salesmen in the United States. Include in your study not only sales clerks in stores, but also door-to-door salesmen, insurance salesmen, automobile salesmen, etc. Present your findings to the class either by charts or other visual means or in a duplicated written report.

11. With several other class members prepare an illustrated report on "National Parks and National Monuments in the United States." The book by the National Geographic Society entitled *America's Wonderlands, the National Parks* will be particularly useful to you.

12. With one or two of your interested friends, prepare an exhibit of maps, charts, and diagrams showing as much as possible about the trees which grow in various sections of the United States. When possible, include exhibits of bark and leaves. The Yearbook of Agriculture, 1949, on *Trees* will be especially useful to you as you plan your work.

13. Collect, and either project on a screen or place on a chart, pictures of the commercially important seafood caught by fishermen in the lakes and off the coasts of the United States. If at all possible, select pictures in color, so that better identification can be made.

14. Prepare a written report for possible presentation to the class on how atomic power plants operate. Try not to make the report too technical, but provide sufficient detail to make the process of conversion clear.

15. Prepare a report on hybridization of seeds to improve quality and yields of farm products. Explain the process in considerable detail, and be ready to present your report to the class or to a small interested group.

16. Select a profession or business which you are especially interested in, perhaps because you are thinking of entering it. Discover all you can about the occupation, including necessary personal characteristics, needed education, job opportunities, etc. Prepare a written report of your findings, including an analysis of your own abilities in terms of what you have discovered.

17. Learn the history of your community, attempting to discover as much as possible about: (a) Why the community grew where it did; (b) When and by whom it was founded; (c) Where the people came from who lived in the community in its early days; (d) Early home life in the community and conditions in business and industry; (e) Major events in the community's history up to the present; (f) The probable future of the community based upon current trends.

18. Join a group to make a study of local, state, and national government in the United States. Read about government in encyclopedias and civics books, and also interview citizens in the community who hold or have held government positions. Report your findings to the class, including changes that in your opinion need to be made to improve governmental efficiency.

19. Prepare an exhibit and a report on "Soils of the United States." You may wish to contact the nearest branch of the Soil Conservation Service as you plan your work.

20. Develop for presentation to the class a report on "Historical Highlights of the Youngest States." Concentrate your attention on Alaska and Hawaii, but you may, if you wish, expand the report to include Puerto Rico, assuming that sometime in the future it may become the 51st state in the United States.









# CANADA

North of the 48 mainland states in the United States and east of Alaska is Canada, the world's second largest nation. From west to east along its southern border, Canada extends almost 4,000 miles. From north to south, it covers a distance of almost 3,000 miles. As the globe or the map on pages 350-351 shows, the most northern part of Canada reaches to 83° North Latitude. The southernmost tip of the country, near the western end of Lake Erie, is located at about 42° North Latitude.

Canada is divided into ten provinces and two territories. As the graph on page 356 shows, more than half of the people of this vast land live in the provinces of Quebec and Ontario. Both of these provinces extend northward from the St. Lawrence River and the Great Lakes. As the population map on page 204 shows, most of the land of Canada is sparsely settled, partly because of climate and soil conditions.

**Brief History.** As in the United States, exploration and settlement of Canada by Europeans began in the east and spread westward. Five years after Columbus discovered land in the West Indies, John

Cabot sailed westward from England in search of a route to Asia. He landed on Cape Breton Island, and claimed the land for England. In 1534, Jacques Cartier, a French explorer, entered the Gulf of St. Lawrence and landed on the Gaspé Peninsula. The next year, he traveled up the St. Lawrence River as far as the present site of Montreal. Cartier claimed all the land he had seen for France. Thus, the stage was set for several wars between the French and the English for control of this territory.

The wars did not occur, however, until about the middle of the 18th century. Between the first explorations and the wars, settlements and colonies gradually were established by both countries. The first permanent settlement in North America north of St. Augustine, Florida, was established in 1604 on the west coast of Nova Scotia by DeMonts, a Frenchman. This settlement which was then called Port Royal, Acadia, is now Annapolis, Nova Scotia. Three years later, another French explorer, Champlain, founded the city of Quebec. By 1642, Montreal was started where the St. Lawrence and Ottawa rivers meet.



These settlements provided France with a good claim to the territory along the St. Lawrence River.

The British, during this same period, were establishing colonies at Jamestown and Plymouth, and employed Henry Hudson to explore farther north. In 1610, he sailed into the bay which now bears his name, and claimed the surrounding land for England. In fact, as a result of his voyage, the British claimed all the land drained by rivers flowing into Hudson Bay. In 1670, the King of England granted a charter to the Hudson's Bay Company, giving the company trading rights in this vast unexplored territory.

Meanwhile, the French colonists, with encouragement from their homeland, pushed westward from Montreal. Among the explorers were Marquette, Joliet, and LaSalle. By 1680, they had moved westward across the Great Lakes and southward down the Mississippi River to the Gulf of Mexico. They claimed this vast area which surrounded the British colonies along the eastern coast of the continent. The French planned to push westward to the ocean and also northward, destroying Hudson Bay fur-trading posts as necessary.

The conflicts between France and Great Britain over control of the land resulted, as you have already learned, in four wars. Do you remember what these wars are called? The British forces won the fourth war decisively. By the Treaty of Paris in 1763, France ceded to Great Britain its territory in Canada and its territory east of the Mississippi. The British made few changes in the French colonies, however, and many French customs are still practiced in parts of Canada today.

When the thirteen colonies which later became the United States revolted against England, the people of Canada did not join the revolt. In fact, when armies from the American colonies attempted to invade

Canada, they were pushed back. As time passed, the Canadian boundaries were steadily moved westward and northward. Captain Cook and Captain Vancouver explored and mapped the Pacific Coast. The Northwest Company, another fur-trading company, was founded by the British. Men employed by this company and the Hudson's Bay Company explored the land and claimed it for England. In time, the Northwest Company merged with the Hudson's Bay Company.

Gradually, Canada was given its independence by Great Britain. In 1867, the four provinces of Nova Scotia, New Brunswick, Quebec, and Ontario were united to form the Dominion of Canada. Other provinces soon were added: Manitoba in 1870, British Columbia in 1871, and Prince Edward Island in 1873. Not until 1949, when the people of Newfoundland voted to join Canada, did the country achieve its present size, however. Considerably earlier, Canada had been given its complete independence. That occurred in 1926 when the Imperial Conference named the self-governing members of the Commonwealth of Nations.

For many years after the early wars and disputes over territory, Canadians feared that their country would be invaded by armies from the United States. That fear has proved to be unfounded. As early as 1817, the two countries agreed to limit the number of military ships on the Great Lakes. In 1846, the present southern boundary of Canada was set by mutual agreement. Numerous other agreements have been made since, including one which defined the borders of Alaska in 1903. Canada and the United States have lived together peacefully and, for the most part, harmoniously for almost 150 years. Together, in recent years, the United States and Canada have planned mutual defense against any possible enemy.





Montreal, established by the early French settlers, is now Canada's largest city. *Above.* This old blockhouse once guarded Montreal. *Right.* Montreal is one of the world's busiest inland ports.



*Left.* Quebec, Canada's oldest large city, has today both ancient walls, twisting streets, and modern buildings and industries. *Above.* The Citadel, a fort built in 1823, overlooks Quebec and the St. Lawrence River.

*Right.* These men are buyers for the Hudson's Bay Company and are inspecting fox skins. *Below.* This drawing shows the first inland trading post being built in 1774 by the Hudson's Bay Company.







## CANADA

0 150 300

Scale 300 miles to one inch

Lambert Azimuthal  
Equal-area Projection

ICE AND SNOW

TUNDRA

EVERGREEN FORESTS

FORESTS

GRASSLAND

DRY GRASSLAND

FARMLAND

MOUNTAINS









Fishing boats are shown at anchor in a snug harbor in the Gaspé Peninsula. *Above.* An oats crop is harvested by binder in a Maritime Province. Long hours of sunlight in Canada have quickly ripened the oats crop.

**Geographical Regions.** Geographically, Canada may be divided into seven regions. These are (1) the Maritime Region, (2) the Great Lakes and St. Lawrence River Lowlands, (3) the Canadian Shield, (4) the Interior Plains, (5) the Western Mountain Region, (6) the Hudson Bay Lowlands, and (7) the Arctic Islands.

(1) **The Maritime Region.** Canada's smallest and most eastern provinces are included in the Maritime Region. These are the provinces of Nova Scotia, New Brunswick, Prince Edward Island, and Newfoundland. Find them on the map on pages 350-351. Newfoundland, as you will

see, includes not only the island of Newfoundland but also the eastern coast of the mainland—an area known as Labrador. The land in the Maritime Provinces is, for the most part, hilly and rocky because this region is an extension of the Appalachian Highlands. Prince Edward Island, however, is less rocky. It is sometimes known as the Garden Province.

Because they are close to the ocean, the Maritime Provinces have more even temperatures than many other areas in Canada. The cold Labrador Current flows southward along the coast of Labrador. The warm Gulf Stream flows northward



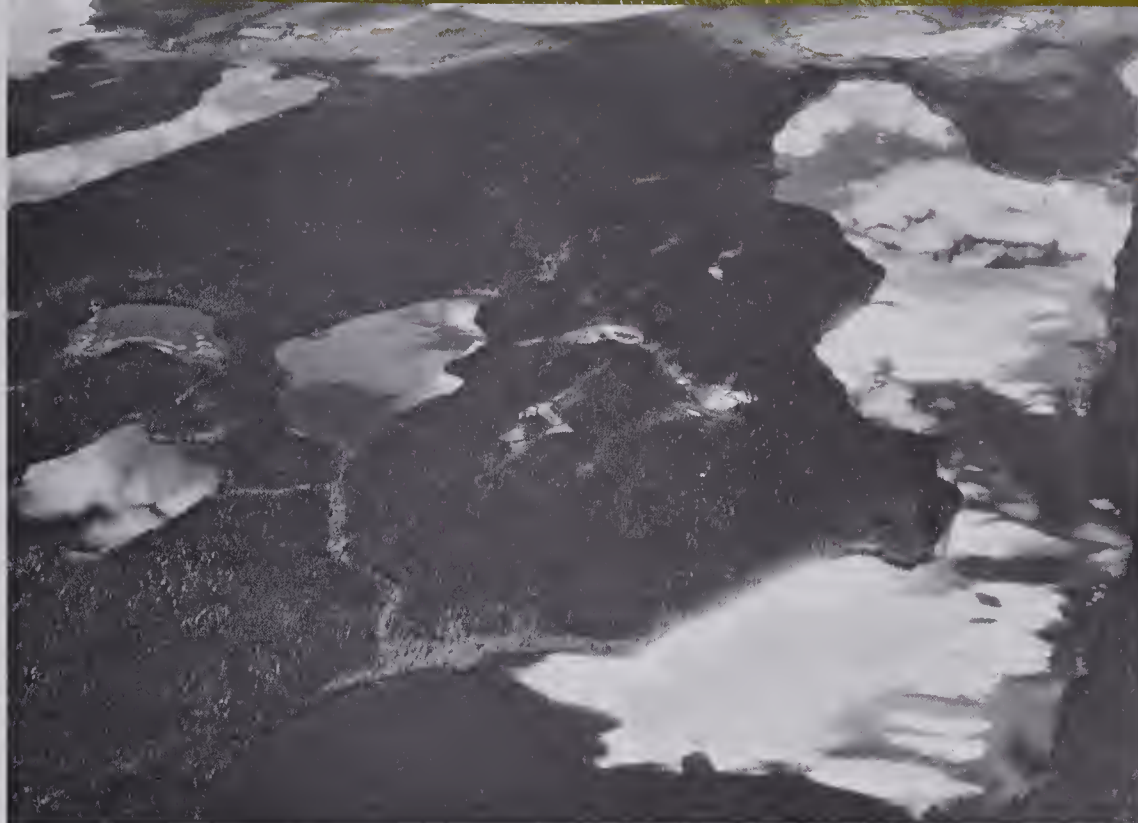
The Isle d'Orleans bridge spans the St. Lawrence River. Montmorency Falls in Quebec are visible in the background. *Below.* The St. Lawrence Seaway provides ocean-going vessels a navigable route.







Two views of the Canadian Shield. *Above.* The top soil is thin and tree growth is scattered in the northern portions of the Shield. *Right.* The Shield is an area of many lakes that are both large and small in size.



along the Atlantic Coast of the United States. These currents meet east of the Gulf of St. Lawrence and cause many heavy winter fogs. The warm Gulf Stream provides a warmer climate for Nova Scotia, New Brunswick, Prince Edward Island, and the island of Newfoundland than might otherwise be expected. Labrador, by contrast, has much colder weather.

**(2) The Great Lakes and St. Lawrence River Lowlands.** The manufacturing heartland of Canada is the lowlands area extending along the St. Lawrence River and the Great Lakes. Southern Quebec and Ontario also are good farming regions because the soil is fertile and the Great Lakes keep the climate mild. The Ontario Peninsula which extends southwestward between Lake Huron and Lake Erie is a particularly fertile farming area.

Montreal, Canada's largest city, is located on the St. Lawrence River in Quebec. At one time, rapids in the St. Lawrence at Montreal blocked the progress of large ocean liners. Today, through a system of locks which is part of the St. Lawrence Seaway, ocean liners may proceed to the Great Lakes. Toronto, the nation's second largest city, is a port on Lake Ontario. A number of other large cities, including

Quebec, Windsor, and Ottawa (the national capital) are located in this region.

**(3) The Canadian Shield.** The largest region in Canada is the Canadian Shield. The Shield extends in a horseshoe-shaped arc from the coast southeast of the Ungava Peninsula to the Arctic Ocean in the northwest. (See map, page 197.) The great glaciers which once covered northern North America scraped this region over and over again. Partly as a result of this glacial action, and partly because the rock beneath the soil is very hard, the Canadian Shield has thin and rather infertile soils. Most of the land is covered by coniferous forests. As the map shows, there are thousands of lakes. The region also has rich deposits of iron, nickel, copper, platinum, gold, silver, cobalt, and uranium.

The Shield is drained by a number of swift-flowing rivers which have been harnessed to provide hydroelectric power for Canada's industries. The Canadian Shield also is the source of many furs.

**(4) The Interior Plains.** The Interior Plains are part of the huge North American Plain. Much of the land in the Prairie Provinces of Alberta, Saskatchewan, and Manitoba, is in this region which is the main grain-growing area of Canada. This sec-





*Left.* An oil-pumping station is surrounded by wheat fields on the wide fertile plains of Saskatchewan. Many farms there are about one square mile in size. *Above.* International Nickel Co. plant-site at Thompson, Manitoba.

tion also has large petroleum fields. Like the Great Plains of the United States, the Interior Plains slope gently upward from east to west. Near Winnipeg, Manitoba, the land is only about 800 feet above sea level. Near Calgary, Alberta, the altitude is about 3,500 feet.

The Interior Plains generally have much greater extremes of climate than do the Maritime Provinces or the areas near the Great Lakes. Summer temperatures are hotter and winter temperatures colder than they are farther east. Generally, the region has little rainfall and irrigation is necessary for many crops.

(5) **The Western Mountain Region.** This region includes all of the province of British Columbia, the Yukon, and the southwestern portion of Alberta. The Rocky Mountains extend from southwestern Alberta to Alaska. The lower Coast Ranges are located near the ocean. West of the Coast Ranges is a region with a mid-latitude marine climate, with fogs and rain throughout the year. The mild temperatures and high humidity are perfect for rapid growth of fine forests. Between the Coast Ranges and the Rocky Mountains are high, fairly dry plateau areas and valleys. Excellent irrigated farmland in



*Left.* View of a fertile, level mountain valley in British Columbia. When irrigated, most of this land produces excellent crops. *Below.* Vancouver is Canada's largest and most active port on the Pacific Coast.







A Canadian ice-breaker works its way through ice-blocked seas near Ellesmere Island. It carries supplies to a weather station on the island that is jointly manned by meteorologists from both the United States and Canada.



the valleys produces fine crops like those raised south of the border in the state of Washington.

(6) **The Hudson Bay Lowlands.** South and west of Hudson Bay, and surrounded by the Canadian Shield, is a small region known as the Hudson Bay Lowlands. Part of this region is swampy land, and part of it is tundra. Some of the land along the western coast of James Bay, the most southerly part of Hudson Bay, is forest-covered. Farming has been attempted near the shores of James Bay with moderate success. The growing season is so short, however, that the region is not likely to become an important agricultural area.

(7) **The Arctic Islands.** North of the Canadian mainland, as the map on pages 350-351 shows, are many islands both large and small. Together these make up a region known as the Arctic Islands. The North Magnetic Pole is located at about  $75^{\circ}$  N.  $101^{\circ}$  W. (See map, page 350.) This pole is the one to which compasses point in the Northern Hemisphere.

Many of the Arctic Islands have huge ice fields. All of the region has either a tundra climate or an icecap climate like that of Antarctica. A few Eskimos live in small settlements on the islands.

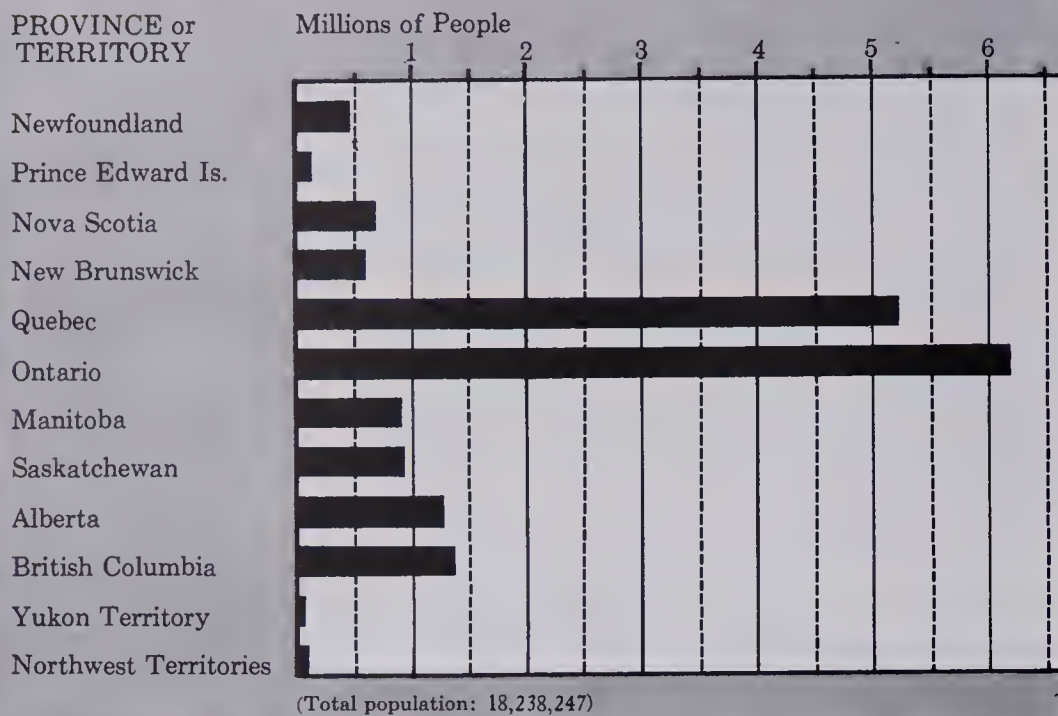
**Beautiful Scenery.** Canada not only is a vast land with rich natural resources, but also is a land of beautiful scenery. The Canadian government has set aside many of the most beautiful and interesting land

Rich deposits of iron ore have been found in northern Canada. The largest of all is shown here. It is located on the Arctic Circle between the Yukon and Northwest Territories.





## ESTIMATED POPULATION OF CANADA IN 1961



Which two provinces in Canada have the greatest number of people? Find these provinces on the map on pages 350-351. Why do you think so few people live in the Yukon Territory?

areas as national parks. In most of the national parks, wild animals live much as they did when the first Europeans explored the land. The Waterton Lakes National Park in southern Alberta has been connected to Glacier National Park in northern Montana to form the International Peace Park.

**Rapid Population Growth.** For a number of years, the population of Canada has been growing very rapidly, due to natural causes and immigration. After World War II, many Europeans found themselves without homes because of the changes made in the boundary lines of several countries. Many of these people, hoping for better living conditions, moved to Canada which was a comparatively empty land. Like the immigrants who came to the United States, most of them quickly adopted the patterns of living which they found in their new home.

The people of Canada, for the most part, are descendants of Europeans. Almost half the people are of English extraction, and many others are descendants of the French. Most of the rest of the Canadians came from other areas of Europe, including the Scandinavian countries, the Russian Ukraine, Germany, the Netherlands, and Poland. Many of the new immigrants have

settled in the Prairie Provinces. In Winnipeg, the capital of Manitoba, newspapers are published in 23 different languages.

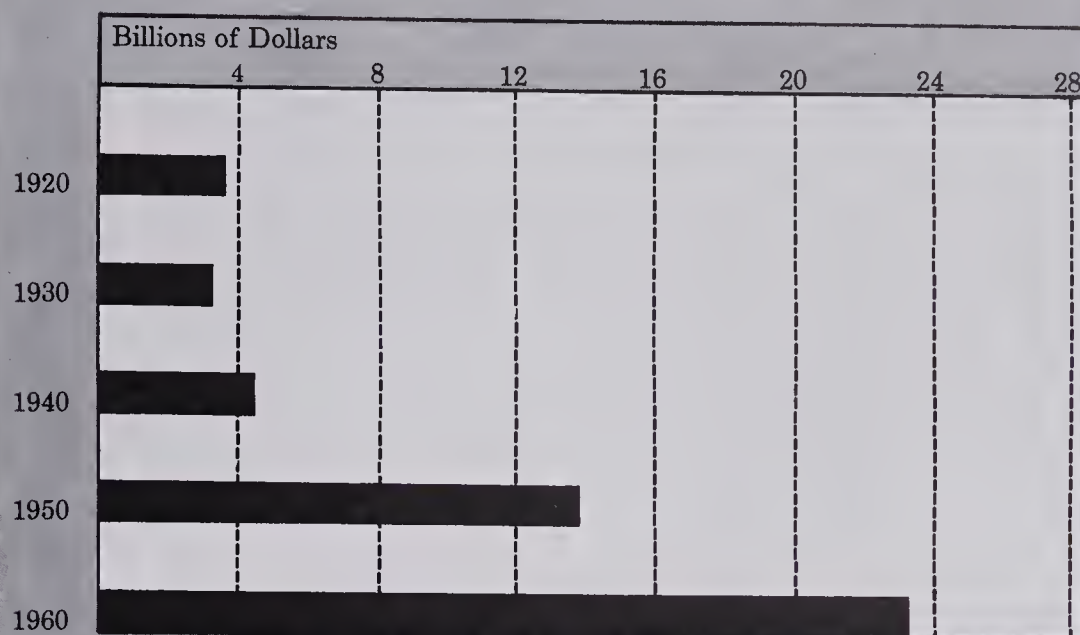
**Rapid Industrial Development.** In recent years, industrial development in Canada has been very rapid. As a matter of fact, manufacturing is now the leading industry in the nation. Although many people consider Canada an agricultural nation, about seven times as much money is made from manufacturing annually as is made from agriculture.

Manufacturing industries have grown rapidly in Canada for several reasons. First, good sources of power, including hydroelectricity, natural gas, and petroleum are available in large amounts. The coal supply is located a great distance from the manufacturing heartland, but major coal fields are nearby in the United States. Second, Canada has many high-grade ore deposits, extensive forests, and tremendous water resources—all required by modern industry. Third, taxes on profits have been lower in Canada than in the United States and many European countries. As a result, many United States and European investors have bought stock in Canadian companies. The industries, therefore, have had the capital needed for expansion. Fourth,



## GROWTH IN VALUE OF MANUFACTURED PRODUCTS IN CANADA: 1920-1960

In what ten-year period did the value of Canada's manufactured products almost double? What factors have made it possible for Canada to become a leading manufacturing nation?



\* 1963 estimated figure is 27,981,800,000

the manufacturing heartland of Canada is located along the world's finest interior transportation system—the St. Lawrence Seaway and the Great Lakes. A good railway system and airlines also connect the major cities of Canada and the United States. Fifth, a fine communications system, utilizing the telephone, telegraph, radio, and television, ties the provinces together.

Undoubtedly, several other factors have contributed to Canada's rapid development as a modern industrial nation. Among these should be mentioned a stable government which gives the people freedom and justice under law. The climate of the northern middle latitudes probably also stimulates the people to work hard. For many years, Canadians have realized the importance of education and have provided good schools for both children and adults. Canadians have invested a considerable portion of their profits and taxes in scientific research in order to improve agricultural yields and manufactured products. They have been quick to adopt or develop machines to modernize farms and factories. As a result of all these factors, the Canadian people today enjoy a high standard of living.

### QUESTION BOX

47

1. What countries have land which extends closer to the North Pole than the northern tip of Canada?
2. What are the names of the ten Canadian provinces? What are the names of the two territories?
3. Which early explorers claimed land for France in North America?
4. What is the present political status of Canada?
5. Why do the Maritime Provinces of Canada have more even temperatures than many other areas of the country?
6. Why does the Canadian Shield have thin and infertile soil?
7. Why do the Interior Plains have greater extremes of temperature than the Great Lakes and St. Lawrence River Lowlands?
8. Why has the population of Canada grown so rapidly in recent years?
9. What city is the national capital of Canada? Where is it located?
10. Why has Canadian industry grown so rapidly in recent years?
11. What is the world's finest interior transportation system?





These miners are working where the ore has been loosened by blasting. This mine, located in western Quebec, yields gold and copper ore.

## MINING

Although much of its land still has not been explored carefully for minerals, Canada is one of the world's leading mineral producers. About one-half of the country's income from exports each year comes from mineral ores and metals. The United States is by far the largest buyer of these ores and metals, but the United Kingdom, West Germany, and Japan also rely on Canadian production.

The minerals needed in the vast metals industries of southern Canada and the United States have caused a tremendous mining boom in Canada. Rapid expansion of the mining industry has had important side effects. Areas which previously had been uninhabited have been opened for settlement and industry. New railroads have been built northward to the mining areas in Quebec, Ontario, and Manitoba. New cities such as Uranium City, Lynn Lake, Schefferville, and Thompson have sprung up. New highways have been opened, and others are planned.

**Nickel, Platinum, and Asbestos.** Canada leads the world in the production of three important industrial minerals. Mines near Sudbury in southern Ontario produce annually about four-fifths of the world's supply of nickel. Other large deposits of nickel-bearing ores have been located in northern Manitoba near Lynn Lake and also near Thompson. Some promising ore deposits have also been located in northwestern Ontario and near the western shore of Hudson Bay in the Northwest Territories. Millions of dollars are being spent to build railroads, homes, mines, and smelters in these areas. Nickel, which helps to make steel stronger, easier to work, and less brittle, is used in making several steel alloys, one of which is stainless steel.

Canada also leads the world in production of the platinum metals and asbestos. Platinum and a number of similar metals are produced mainly in the areas where nickel is mined. These precious metals are of great value in industry because they can



withstand very high temperatures.

Asbestos, by contrast, is a nonmetallic mineral which does not burn easily. It is found in a fibrous state in rock. Asbestos is used in a number of ways in industry. Its soft, rather flexible fiber can be woven into cloth to make fireproof clothing. It is also used in making brake linings for automobiles and insulation for pipes and stoves. Most of the asbestos mined in Canada comes from southern Quebec.

**Iron Ore.** The most valuable of all Canadian minerals is iron ore. In two years' time, between 1954 and 1956, production of iron ore in Canada tripled. It has been growing rapidly ever since. About 90 per cent of Canada's iron ore production is exported, mostly to the United States.

Major iron ore fields are located on Belle Isle, Newfoundland, and in northern Ontario. Large deposits of iron ore are located on the border between Labrador and Quebec near Schefferville, Carol Lake, and Wabush Lake. The most modern methods of mining iron ore are used in this area. The ore is shipped by rail to the port of Sept Îles on the St. Lawrence estuary. From there, it is transported by ship to the major steel-producing centers located along the Great Lakes. The largest iron ore deposit yet found is on the Arctic Circle near the border between the Yukon and Northwest Territories. A railroad will probably be built to Skagway, Alaska, from which port ships will take the ore to mills in California and Japan.

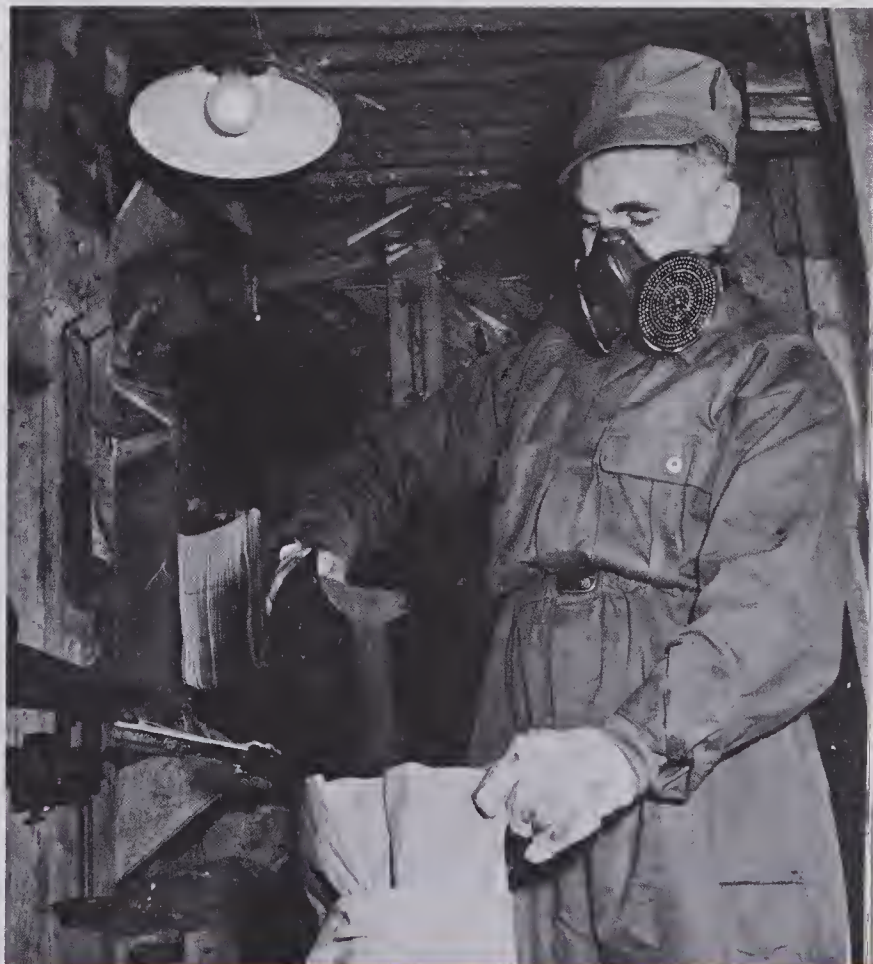
**Uranium.** Another valuable mineral found in Canada is uranium. The main producing areas are near Great Bear Lake in the Northwest Territories, the Uranium City area in northwestern Saskatchewan, and the Blind River area in northern Ontario. Once, 24 plants were processing more than 44,000 tons of uranium ore daily. Because not much uranium ore is needed, only two plants are now operating.



*Above.* Experts estimate that Quebec's open pit asbestos mines will be productive for 150 years. *Below.* Miners emerge from an underground iron ore mine in Newfoundland.



Wearing a protective mask, a worker packs uranium concentrate into 100-pound bags for shipment to an atomic energy plant.







Long conveyor belts in a crushing mill carry ore containing copper and gold.



*Above.* Molten nickel, heated to more than 2700° F., is poured into molds at a smelter. *Below.* Molten zinc is also poured into molds. As the metal cools, bars will be formed.



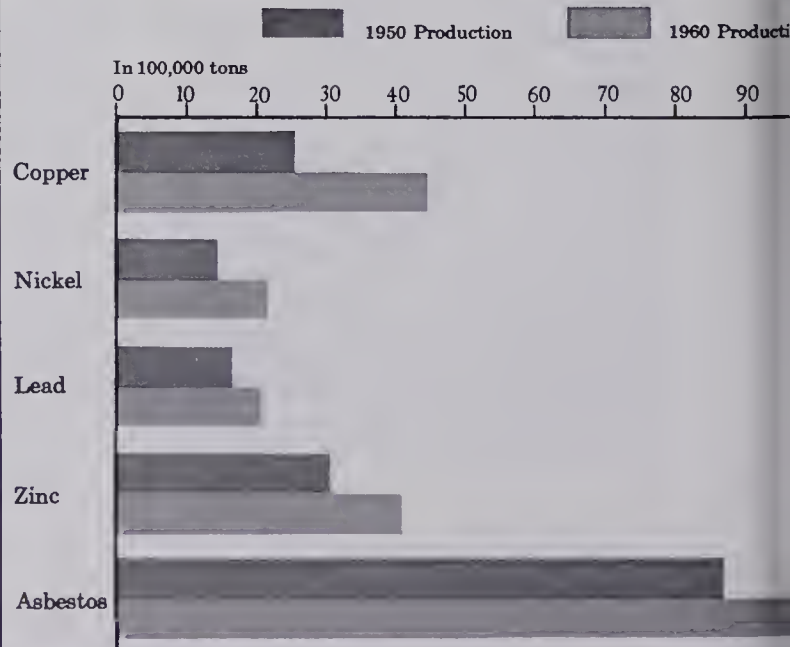
Canada also has developed its first atomic energy plant. Although its hydro-electric and petroleum power sources are vast, Canada is experimenting with this newer, and as yet more costly, way of producing power.

**Other Minerals.** Many other important mineral ores and metals are produced in Canada. Only four other nations produce more copper. Much of the copper is mined in the Sudbury area of Ontario. Two other major copper deposits, where mines have recently been opened, are in northern Quebec in the Lake Chibougamau area and on the Gaspé Peninsula.

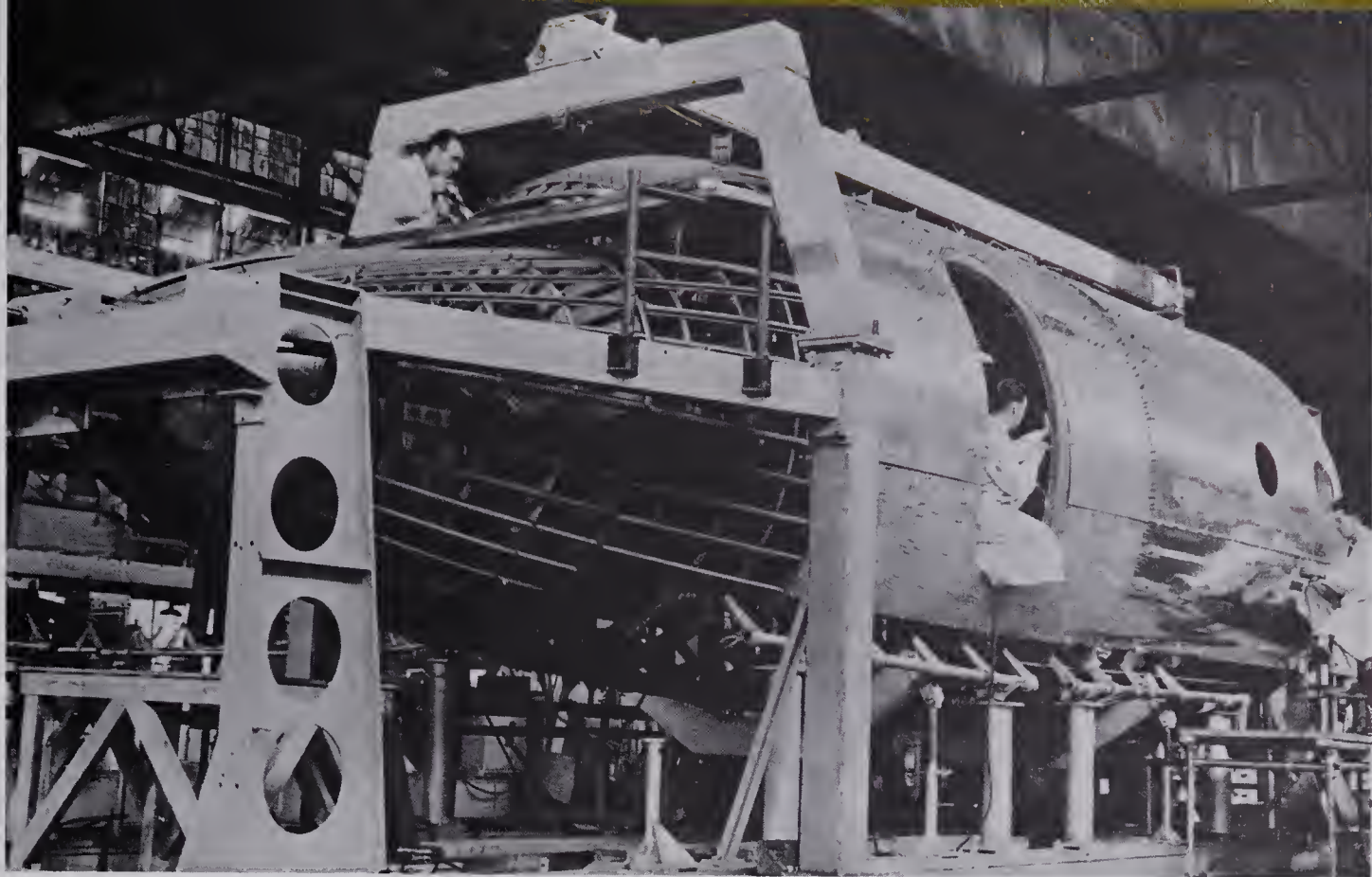
Only the U.S.A. produces more zinc and aluminum, only four countries produce more lead, and only two others more silver and gold. Many non-metallic minerals such as gypsum and potash are also mined in large amounts. What is probably the world's largest deposit of potash was discovered recently in southern Saskatchewan near Esterhazy. To serve the metals industry and use by-products of the petroleum industry, a chemicals industry is growing rapidly. Chemicals are needed in processing ores.

About one-third of Canada's income from exports comes from selling mineral ores and metals to world markets. The United States is Canada's chief customer.

#### GROWTH IN PRODUCTION OF SELECTED NON-FERROUS METALS—1950 TO 1960







Industrial production in Canada has shown rapid gains since 1940. This picture shows riveters at work on the nose section of a jetliner.

## MANUFACTURING

Canada ranks seventh among the world's nations in the amount of its manufactured goods. Many of the manufacturing industries in Canada are based upon the country's mineral resources. Five of the leading industries, for instance, are basically dependent on the nation's mineral resources — petroleum, automobiles, iron and steel, railway cars, and electrical goods and appliances. Two other major industries use a mineral resource which is imported from other lands, because Canada has the vast hydroelectric power resources needed to refine it. These seven industries will be discussed briefly in the following pages. Several of the largest manufacturing industries in Canada are based upon forest resources and agricultural products and will be discussed in a later section.

**The Petroleum Industry.** Canadian production of petroleum, petroleum products, and natural gas has been growing rapidly in recent years. A great deal of the output

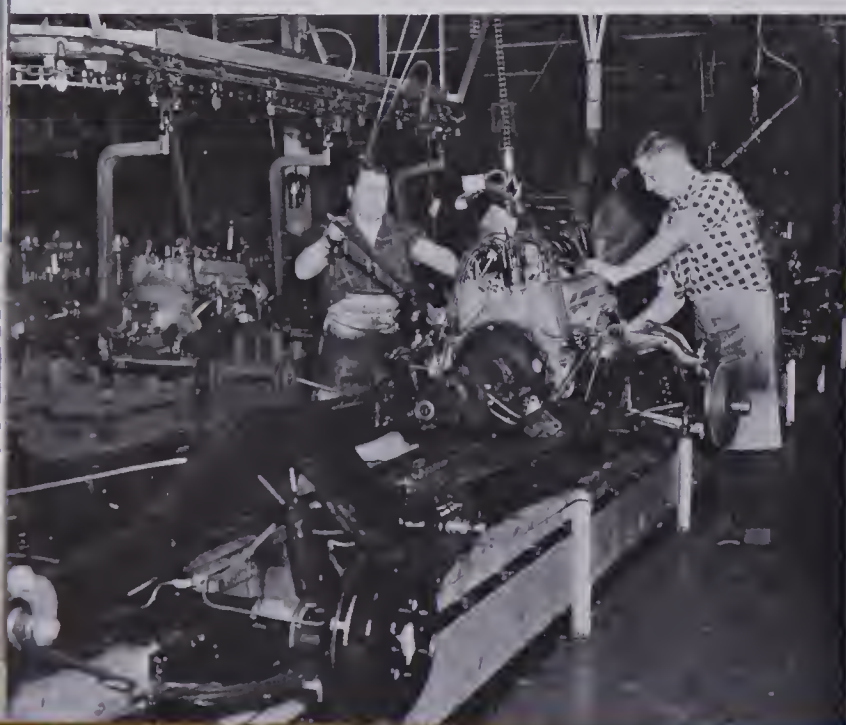
of the petroleum industry is used within the country. Like citizens of the United States, Canadians use large amounts of gasoline to keep their automobiles, trucks, and farm machinery moving. Large amounts of natural gas also are used for heating and for industrial power. The petroleum industry in Canada, as in the United States, produces many by-products including asphalt, synthetic rubber, and other petrochemicals. In terms of the value of its products, petroleum is Canada's most valuable mineral product.

As in the United States, petroleum and natural gas fields are located a long distance from the industrial heart of the country. Most of the largest producing fields are in Alberta, but fields in southern Saskatchewan and Manitoba have been growing in importance. Several pipelines have been built to move the petroleum and natural gas from the fields in Alberta and Saskatchewan to far-distant refineries. One of the principal oil pipelines extends partly





*Top.* Synthetic rubber is being dried in this machine. As it dries, it can be checked by workers who look through glass windows. *Center.* The oil pipeline shown under construction is located near Regina, Saskatchewan. *Bottom.* An engine is being mounted on a chassis in this Canadian assembly line.



through the United States to the port of Sarnia at the southern tip of Lake Huron. Sarnia is one of Canada's major refining centers. Feeder lines from Saskatchewan and Manitoba fields have been built to this main trunk line. Distribution lines also have been constructed from this main line to refineries located in nearby cities on both sides of the border. An oil pipeline has also been built from Portland, Maine, to Montreal, which is another major refining center. Most of the crude oil used in Montreal refineries comes by ship from the oil fields in Venezuela. Petroleum products are sent from Sarnia and Montreal to many areas of eastern Canada by smaller pipelines.

There is another important oil pipeline which extends from Edmonton westward to Vancouver. A branch line extends southward across the border to the state of Washington. Not only are British Columbia and Washington supplied with crude petroleum through this pipeline, but also ships at Vancouver bound for California and Japanese ports.

Natural gas pipelines extend for many miles eastward and westward from Alberta. The natural gas is piped as far east as Toronto and Montreal. The latter pipeline is the longest in North America — about 2,300 miles.

**The Automobile Industry.** Only four nations in the world have more motor vehicles in use than Canada, which has about one vehicle for every four persons. Most of these automobiles and trucks are made in Canada. The center for this industry is Windsor, located across the Detroit River from Detroit, Michigan. Considerably fewer automobiles are made in Canada than in the United States, partly because there are fewer people and a smaller demand. Nevertheless, in terms of value of products, the automobile industry is the fifth largest in Canada. Methods of production are like



those used by automobile manufacturers in the United States. Can you remember what these methods are? Many automobile companies have factories on both sides of the border.

The highway system in Canada was developed more slowly than that in the United States. Most of the good Canadian highways are located, naturally, in the sections of the country which are most densely populated. A superhighway has been built across southern Canada to connect Vancouver, British Columbia, and St. John's, Newfoundland. This highway, called the Trans-Canada, is about 5,000 miles in length. It connects all of Canada's major cities except Toronto and Edmonton. They are connected to it by other highways.

To safeguard the defense of Alaska during World War II, the Alaska Highway was built by the United States from Dawson, British Columbia, northward to Fairbanks, Alaska. This road and others which have been built in areas with few people have not been hard surfaced as yet.

**Iron and Steel.** Canada's steel and metal fabricating industries employ about 200,000 workers annually. In value of products, these industries are second only to the foodstuffs and beverages industry. The nation has four large steel mills, two of which are in Hamilton at the western end of Lake Ontario. Another is located at Sault Ste. Marie at the eastern end of Lake Superior, and the fourth is in Sydney, Nova Scotia. Ores from United States mines are mixed with ores from Canadian mines in these mills. Coal from nearby mines is used in the mill at Sydney, but the other mills mostly use coal imported from the United States. The steel is used, as in the United States, in making many other products. These include automobiles, railway tracks and cars, structural steel, pipe, ships, farm machinery, machine tools, and bicycles.



*Top.* Shopping centers, warehouses, and housing developments line a superhighway near Toronto. *Center.* A picture of the Alaska Highway, taken during World War II, shows army trucks crossing a river. *Bottom.* This type of steel girder is commonly used in bridge-building. It is 112 feet long.





**Refining Metals.** One of the largest industries in Canada is smelting or refining aluminum, nickel, zinc, lead, and copper. These nonferrous metals, which are metals containing no iron, bring Canada more than a billion dollars a year. Together, they are the nation's second most valuable product. Most of the refineries or smelters producing nonferrous metals use mineral ores from Canadian mines. The main exceptions are the aluminum plants in Arvida, Quebec, and Kitimat, British Columbia, which use bauxite imported from Jamaica.

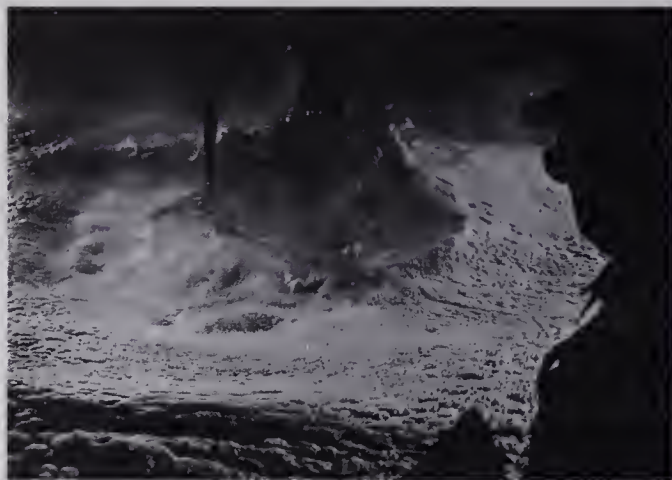
Vast amounts of electricity are required in refining aluminum. As Canada produces a great deal of electricity, aluminum refining has rather naturally developed there even though bauxite must be imported. Only the United States produces more aluminum than Canada. Most of the aluminum produced in Canada is exported to other countries.

**The Aircraft Industry.** The Canadian aircraft industry does not begin to compare in size with the aircraft industry of the United States. It is a major industry, however, producing both military and commercial planes. Aircraft plants in Canada manufacture a number of different types of planes. Many small pontoon-equipped planes are built for use by explorers and companies with outlying plants. Jet planes are built for use by the Canadian Air Force. Large passenger and cargo planes also are constructed. The principal commercial airlines fly transcontinental and international routes. For longer flights, however, planes built in the United States or Great Britain are used.

In many ways, air travel is more important to Canadians than it is to the people of the United States. In vast areas of northern Canada, roads and railroads do not exist. Travel on rivers is possible during summer months, but many streams have sections with rapids and falls around which



Why is the Kitimat Plant located near a power source rather than the ore?



Alumina has dissolved in this solution, but the impurities have not. When agitated as it cools, the alumina will come out of solution. *Below.* The aluminum is poured into molds.







Aluminum ingots are bound together for easier loading on this dock. They are shipped to all parts of the world from Canadian ports.



This plane will carry surveyors to a camp 360 miles away in three hours. Railroads pass through rugged country in British Columbia.



boats and material must be carried. Air travel, though, is possible to within a few miles of any spot. During summer months, lakes provide natural airports for pontoon-equipped planes. The same lakes become runways for ski-equipped planes during the winter. The airplanes have made possible rapid exploration and development of mineral deposits in the Canadian Shield. Millions of tons of cargo are carried by Canadian airlines each year, much of it to outposts of civilization in the far north.

**Railway Cars and Engines.** Another of Canada's major manufacturing industries produces engines and cars for the nation's railways. The necessity of transporting ores from remote sections of the country to the Great Lakes-St. Lawrence waterway has caused rapid expansion of rail lines in recent years. Canada has two main trans-continental railway systems—the government-owned Canadian National Railway System and the Canadian Pacific Railway. Both systems operate not only railroads, but also airlines, hotels, telegraph systems, motor truck services, and bus lines. The railways, together, have more track mileage than that found in any other countries except the U.S.S.R. and the United States. Generally, the Canadian National Railway has the more northern route across the continent. The Canadian Pacific Railway has some lines which extend into the United States. The freight yard in Winnipeg, where the lines meet in central Canada, is one of the world's largest. The map on page 206 shows this extensive rail system, and also shows how the rail systems of Canada and the United States are connected.

Producing engines, passenger cars, and freight cars for the vast railway network in Canada provides employment for about 30,000 workers. In recent years the Canadian railways have bought much new equipment including diesel engines, streamlined passenger trains, and freight cars. In





Most of the rail traffic between western Canada and the north-central United States moves through the yards in Winnipeg.

one recent year, factories produced railway equipment worth almost three hundred million dollars.

**Electrical Goods and Appliances.** Among the electrical products made in Canada are electric wire and cables, light bulbs, radio and television sets, heavy electrical machinery, refrigerators, vacuum cleaners, washing machines, and other appliances. The electrical-products industry, as in the

Canada's electronic industry has expanded rapidly in recent years. This girl is working on tubes used in electronic devices.



United States, has been expanding rapidly because the people have higher incomes and more leisure time. Many of the same companies which make electrical products in the United States also produce the same appliances in Canadian factories. More than 75,000 workers are employed in this industry, which produces goods worth about 350 million dollars.

## QUESTION BOX

48

1. Why may additional rich mineral deposits be discovered in Canada in future years?
2. In production of what three minerals does Canada lead the world?
3. What valuable power source, other than petroleum and water, does Canada possess in considerable quantity?
4. What two industries are partly responsible for the rapid development of the chemicals industry in Canada?
5. Where are the largest petroleum fields in Canada? How are petroleum and natural gas delivered to other areas from these fields?
6. How are petroleum refineries in Montreal supplied by crude oil?
7. Where is the center of the automobile industry in Canada?
8. Why was the Alaska Highway constructed during World War II?
9. Where are the four large steel mills in Canada? Why do you think these mills were built where they are located?
10. What are nonferrous metals? In the production of which of these metals does Canada rank second among the nations of the world?
11. Why is air travel of particular importance to Canadians?
12. What is one reason for the growth of the railway systems in Canada?





Rich farmland is one of Canada's chief natural resources. Young cucumber plants in British Columbia have been covered to protect them from frost.

## AGRICULTURE AND RELATED INDUSTRIES

The number of farms and farmers in Canada has been dropping steadily in recent years, as it has in the United States. The amount of crops and livestock produced, on the other hand, has been gaining steadily. Also, the size of the individual farm has grown markedly as agriculture has become more highly mechanized. In fruit-growing areas of Canada, farms today average from 12 to 20 acres in size. Where dairy farming and mixed farming prevail, farms average from 100 to 150 acres. In the Prairie Provinces, the size of farms varies from about 300 to 600 acres.

Most farms in Canada are in the southern part of the country near the border with the United States. The long cold winters, short growing season, and thin, poor soils are the main hindrances to farming farther north. Because of the milder climate, a greater variety of crops can be grown on the Ontario Peninsula than in the other farming regions. About one-third of

Canada's farm products are raised in Ontario, the majority being raised in the lakes region.

Farming practices vary considerably in different parts of Canada. In the eastern provinces, mixed farming is generally practiced. Most farmers raise some vegetables and root crops, some grain and hay, fruit, and livestock. There are many truck farms near cities. Some of these farmers may specialize in raising a particular crop, but they usually raise a variety of crops and keep a few farm animals and poultry.

In the western provinces, some mixed farming is carried on north of the grain-growing areas and on irrigated land. In recent years, farmers in the Prairie Provinces have been planting a wider variety of crops. Thus they need not depend entirely on one crop which may fail or for which there may not be a good market. The production of oilseeds has grown during this period of diversification.



## GRAINS

For many years, the leading crop of Canada has been grains. Although some grain is grown in all the provinces, most of it is raised in the southern part of the Prairie Provinces. Each year in Saskatchewan, Alberta, and Manitoba, hundreds of millions of bushels of grain are grown in addition to other crops such as hay and oilseeds. Wheat usually is Canada's most valuable grain, and more wheat usually is exported by Canada than by any other country. Nevertheless, the combined production of grains such as oats and barley for livestock feed consistently surpasses wheat production.

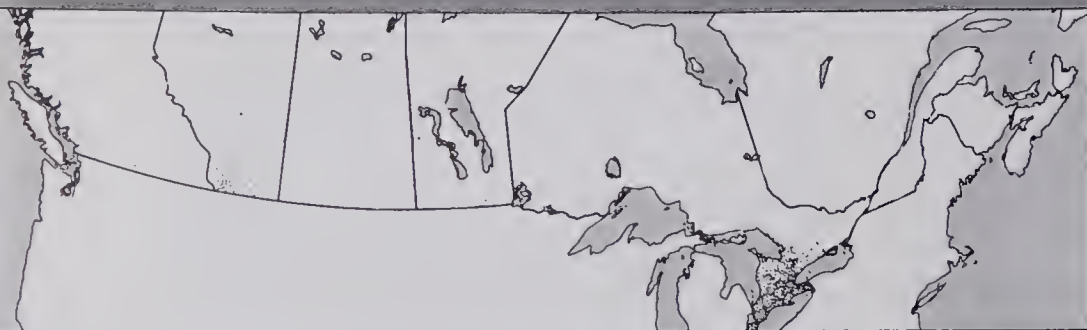
**Wheat.** The climate of the Prairie Provinces, where most of the wheat is grown, is almost perfect for spring wheat. Much rain usually falls in the early summer and helps the growth of the wheat stalk. Later, the long, sunny, summer days hasten the

growth and ripening of the grain. The wheat grown in the Prairie Provinces is plump, bright, and hard, and makes flour of the finest quality. In making flour, this hard wheat often is mixed with softer wheats grown in more humid climates.

Some winter wheat is grown in southern Ontario and in sections of the Maritime Provinces where winters are mild. The winter wheat provides ground cover during winter months and feed for cattle. Winter wheat production in Canada usually is less than one twenty-fifth as great as the spring wheat crop, however.

The almost level land in the Prairie Provinces makes possible the use of machinery in plowing and seeding the land and in harvesting the crops. Two methods of harvesting the grain are used by Canadian farmers. In the western provinces, when the stalks are standing well, combines are used to cut and thresh the grain. If a storm has caused the grain stalks to

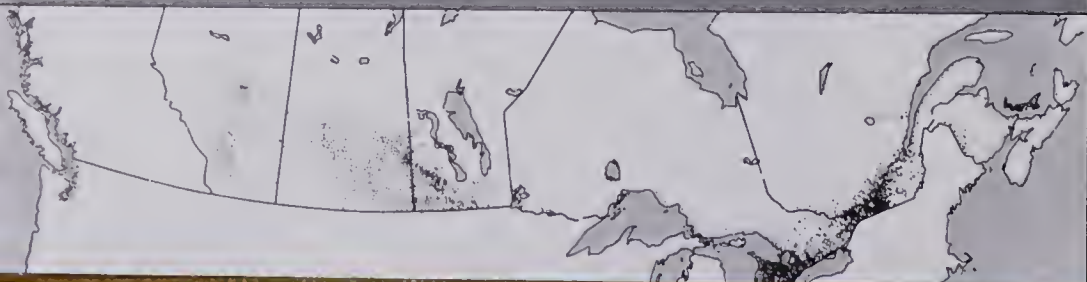
WINTER WHEAT



FALL WHEAT



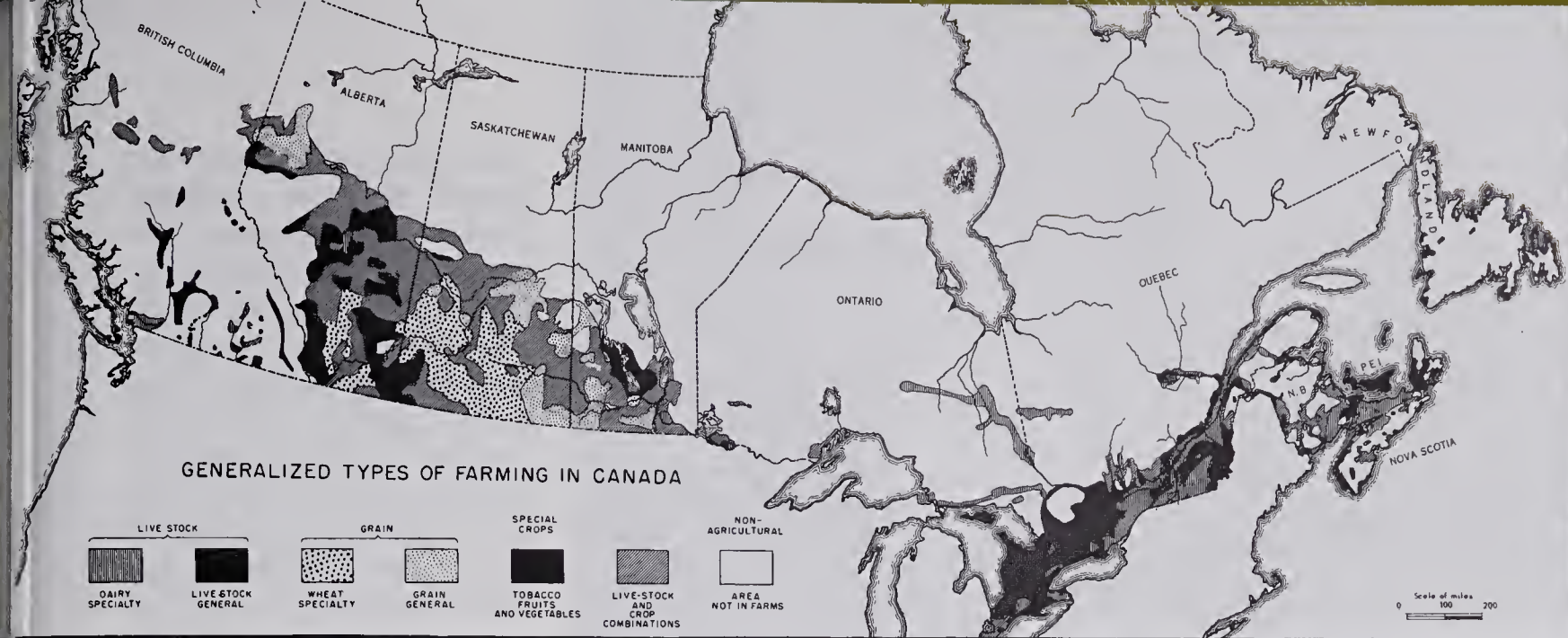
OATS



The picture above shows a combine, which is used when stalks of wheat are upright. A binder, which cuts stalks closer to the ground, is shown below. As you study the maps on the left, you will note that very little winter wheat is grown in Canada.







This map shows where different types of farms are located in Canada.

collapse, binders drawn by tractors are used. These binders also are used in small eastern fields. The binders can cut the bent stalks closer to the ground, and can preserve more of the grain than the combines. When binders are used, the sheaves of grain are set up in piles called **shooks** in Canada and **shocks** in the United States.

After standing for awhile in the field, the grain is put through a threshing machine. After threshing, most of the wheat crop is hauled in trucks or by railroad to a grain elevator. Each truckload of wheat is graded and weighed as it arrives. Then it is dumped into a **hopper** or small bin in the floor of the elevator. Small buckets on continuous belts carry the grain high in the elevator to bins, in which grains of different qualities are stored. From the bins, the grain can be loaded by means of chutes directly into a railroad car. If the elevator is located on a dock, the grain can be loaded directly into the hold of a vessel.

Most wheat raised in the Prairie Provinces is shipped by rail to Port Arthur or Fort William on the north shore of Lake Superior. From there, the wheat is carried by ship to flour mills in cities along the Great Lakes and the St. Lawrence Seaway, and in countries overseas. Wheat is also carried by rail to the Pacific Coast, where

it is used in making flour or is shipped from Vancouver. Some years ago, before the St. Lawrence Seaway was completed, a railroad was built from the wheat-growing region of Saskatchewan to Churchill on Hudson Bay. Churchill is about as far from Regina as Port Arthur and Fort William, but is much closer to wheat markets in Europe. Because of ice, the shipping route through Hudson Bay is open only from about the middle of July to the middle of November. The St. Lawrence Seaway stays ice-free for a considerably longer period of time.

Much Canadian wheat is made into flour in mills located in Winnipeg, Montreal, Toronto, and other centers. Some of the flour is exported, but since grain may be transported more easily than flour, considerably more grain than flour is shipped overseas.

**Flour Milling.** As you know, wheat is used mainly in making flour. Several different kinds of flour can be made, depending upon the type of wheat and the process used. At flour mills, wheat goes through several processes before it is ground into flour. First, the wheat is screened to remove any bits of stalk or dirt which may be in it. Then the wheat is washed and allowed to soften, so that the outer layers





Tall grain elevators, usually located alongside a railroad track or waterway, are a common sight throughout the Prairie Provinces of Canada. Much of the grain is transported by train and/or boat to flour mills in Canada and the United States. Some of it is shipped by boat through the St. Lawrence Seaway, or from a port on Hudson Bay to other countries.

of the wheat kernel called **bran** may be easily removed. The wheat is then passed through rollers which crush the kernels. A sifting process then separates most of the bran from the white inner parts of the wheat kernels, which then are ground and sifted again. Flours of very high quality are ground and sifted several times so that, finally, the particles of flour are very white and very small. Whole-wheat flours, which are browner, contain the bran as well as the inner part of the wheat kernel.

Unfortunately, much of the food value in the wheat kernel is contained in the bran. Many years ago, when flour was ground by hand, using stones, the bran was not removed from the flour. When mechanical flour milling was started, much food value was lost. However, scientists soon discovered how to add vitamins and minerals to white flour so that it has as many food elements as other flours. The bran which is removed at the flour mills is used mainly as livestock feed.

**Other Grains.** The oats crop in Canada is also large; in some years, it surpasses the wheat crop. Much of the oats crop is raised in the eastern provinces where it is used mostly as feed for farm animals. Part of the crop, however, is ground into oatmeal

and made into various kinds of breakfast food. Since oats mature more rapidly than wheat, the seed can be sown after the wheat has been planted. Partly for this reason, many farmers in the Prairie Provinces plant oats on some of their land.

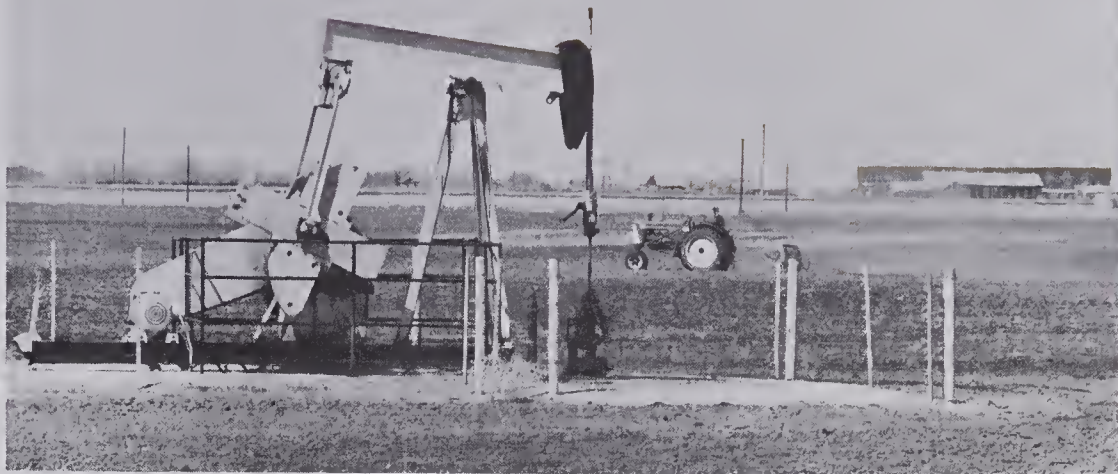
Barley is the third largest grain crop in Canada. Usually, the barley crop is a little less than half as large as the wheat or oats crop. Barley matures even more rapidly than oats, and it may be planted still later than the oats crop. Barley is raised mostly to be fed to hogs. Hogs fed on barley remain fairly lean instead of getting fat, and produce high-quality bacon and ham.

Some rye also is grown in Canada, but the crop is small when compared to wheat, oats, and barley. Rye is planted especially by farmers in the more arid regions of the Prairie Plains where there is not enough water for irrigation. Rye does not suffer much from dry weather, and its roots help to prevent dry soil from being blown away by strong winds.

Considerable corn also is raised in Canada. Corn will ripen well only in the warmer agricultural sections, but much corn is raised elsewhere because the stalks make good feed for farm animals.



The vast, level plains of Alberta are ideal for planting and harvesting large crops of cereal grains. Producing grains has been the major industry of this area for many years. During the 1950's, oil fields were discovered in many parts of Alberta. Exploration for new oil fields is continuing throughout the province. This farmer cultivates his land in the shadow of an oil derrick.



Some of the farmers in the eastern provinces raise buckwheat. Buckwheat grows quickly, and can be planted later than other crops. Buckwheat will grow in the thin, poor soils of hilly land where other crops would not grow. Buckwheat flour is used for making griddle cakes. The seeds also make good feed for cattle and chickens.

### OILBEARING CROPS

A number of crops are grown in Canada primarily to provide vegetable oils. Flax is grown extensively in the Prairie Provinces. It thrives well on land that is being cultivated for the first time. Most of the flaxseed is used in the manufacture of linseed oil which, in turn, is used in mixing paint. The solid matter that is left is pressed into an oily cake which, because of its high protein content, is prized as a feed for livestock.

Other oilbearing seeds of growing importance in Canada include rapeseed, mustard seed, soybeans, and sunflower seed. The oils obtained from these seeds are used in several ways in industry, mostly in manufacturing soaps and paints or in processing foods.

### FRUITS

Fruits such as apples, peaches, pears, cherries, plums, and many kinds of berries are grown in the southern areas of the mainland provinces. Main centers of production, however, are irrigated valleys of British Columbia, the Ontario Peninsula, the St. Lawrence Valley in southern Québec, and the Annapolis Valley in southwestern Nova Scotia. Although fruit-growing areas are quite limited in extent, production is approximately sufficient to meet the needs of the people. If the population continues to grow at the present rate of three per

**British Columbia apples find a ready market in Great Britain.**





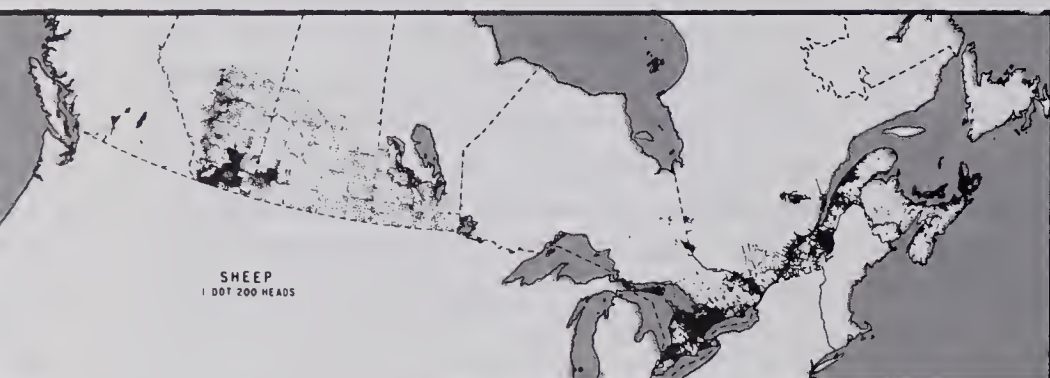
cent a year, however, more fruit may have to be imported. No area of Canada has a climate warm enough for citrus fruits. Consequently, Canada must import all of its citrus fruit supply from the United States, and from nations in the West Indies and Central America.

**Apples.** The most valuable fruit crop raised in Canada is apples. About one-third of this crop is grown in British Columbia, the nation's main fruit-growing center. Conditions in the Okanagan and West Kootenay Valleys in southeastern British Columbia are much like those in the Yakima Valley region of Washington—almost perfect for growing apples. Another important apple-growing region is the Annapolis Valley in southwestern Nova Scotia, which was one of the first regions to be settled by Europeans. Apple trees were planted soon after the settlers arrived, and apples have been a major agricultural product of Nova Scotia ever since.

**Other Fruits.** Southeastern British Columbia and the Ontario Peninsula are the two main areas in which pears, peaches, cherries, and plums are grown. Many of the plums are dried to make prunes. Most of the grapes grown in Canada are raised near the Great Lakes in southeastern Ontario. Apricots and loganberries are grown commercially only in British Columbia. Strawberries, raspberries, and blueberries are grown in these two provinces and in Quebec, Nova Scotia, and New Brunswick.

## LIVESTOCK RAISING AND RELATED INDUSTRIES

By far the largest source of farm income in Canada is livestock. The income received from livestock and poultry usually is about one and one-half times greater than that received from all grains, seeds, and hay combined! Moreover, dairy products bring Canadian farmers more money



*Top.* This map shows that many sheep are raised in eastern Canada. Many farmers there raise sheep on mixed farms. *Center.* This map shows the distribution of dairy cattle in Canada. *Bottom.* The larger cattle ranches are located in Alberta and Saskatchewan.





*Left.* A cowhand in Alberta leads a roped calf across a stream. *Center.* The owner of a 54,000 acre ranch in Saskatchewan inspects his herd, fences and water supply by air. *Right.* A dairy farm in New Brunswick.

annually than does the wheat crop. It is easy to understand, therefore, why much cultivated land is used to grow food for livestock.

Before settlement by Europeans, Canada was one of the world's greatest pasture lands for wild animals. The bison, or buffalo, which grazed in tremendous herds on the grassy plains of the Prairie Provinces, led all other animals in total number. Most of these animals disappeared many years ago, except for a few now kept in national parks by the government. Deer, elk, and moose still are found in forested areas, and caribou herds are kept by some Eskimo tribes in the far north.

**Cattle.** Today, cattle-raising is Canada's main livestock industry. The largest cattle ranches are located in Alberta along the eastern foothills of the Rockies. Other large ranches are in northern Alberta, northern and southern Saskatchewan, on the high interior plateaus of British Columbia, and in northeastern Manitoba. Both beef and dairy cattle are raised on the mixed farms of southeastern Canada. Much of southern Ontario, near Georgian Bay, and a considerable amount of land on Prince Edward Island are used for cattle-raising. The nation's farms and ranches support about 12 million beef and dairy

cattle, about a third of which are slaughtered for meat each year.

Dairy farming is concentrated near large cities in southern Ontario and Quebec, although some dairy cows are raised in every province. In the west, dairying is carried on mainly in the mixed farming and irrigated areas. Special attention is given throughout Canada to the feeding and care of fine breeds of dairy cows. Modern dairies produce high-grade butter and cheese, canned milk, powdered skim milk, and other dairy products. Modern inventions such as milking machines and cream separators help to lighten the work of the dairy farmer. At one time, Canada exported a considerable part of its dairy products, especially cheese. Today, however, the population has grown to the extent that the domestic market consumes the total dairy production.

**Other Livestock.** Canadian farmers and ranchers do not raise as many hogs as cattle, but they slaughter more hogs each year for meat. In recent years, about 72 pounds of beef and 55 pounds of pork have been produced annually for every Canadian. Obviously, Canadians eat large quantities of meat, as do people in the United States.

Poultry-raising is common on mixed farms, but commercial poultry farms also





A large herd of sheep is shown being herded along a highway in British Columbia. More than 1,500,000 sheep are raised in Canada.



The men shown at left are shearing sheep. They are experts and can shear more than twenty sheep per hour.

are increasing in number. In a recent year, there were about 70 million chickens and 5 million turkeys on Canadian farms. Income from eggs and poultry meat brought the farmers more than 300 million dollars.

Sheep are raised on western ranches primarily for their wool. Near large cities in the east, small flocks of sheep are raised on mixed farms primarily for their meat. Canadian farmers usually raise about one-sixth as many sheep as they do cattle.

Although horses are still commonly used on some farms in Canada, automobiles and tractors are displacing them rapidly. Most of the horses today are on small farms where mixed farming is practiced.

### IRRIGATION AND DRAINAGE

Just east of the Rocky Mountains, the climate is milder than it is farther east in the interior. Winds descending the western mountain slopes are warmer than those which occasionally move across the land from the north. The westerly winds also grow warmer as they descend, and consequently take up rather than release moisture. As a result, this area generally is a rather dry region. The soil, however, is

unusually fertile and can be cultivated where enough water can be obtained. Extensive irrigation systems have been constructed, especially in southern Alberta and Saskatchewan and between the ranges in British Columbia, to utilize water from Rocky Mountain streams. The cost of irrigation is more than offset by the high crop yields per acre. In southern Alberta alone, large crops of sugar beets, alfalfa, and legumes are grown on more than half a million acres of irrigated land.

In coastal areas of Nova Scotia and New Brunswick, an opposite problem exists. Considerable areas along the southern coasts, which have fertile farmland, are occasionally flooded by high tides which occur in the Bay of Fundy. With government assistance, dikes have been constructed to protect good crop land from the tides and to recover marshlands which could not otherwise be used.

### CANADA'S FARM PROBLEM

Canada's farm problem is much like that of the United States, but the ways of solving it are somewhat different. The nation's farmers are able to produce more grain, especially wheat, than the people



can use, and more than can be sold to other countries. Canada for many years has had a great deal of surplus wheat. The government has developed a cooperative marketing agency which guarantees the farmers a fixed price for their grain. When the government can sell the wheat for a price higher than the guaranteed price, the farmers are paid the difference. When the wheat has to be stored for a considerable period of time, or sold at a lower price than that guaranteed the farmers, the government bears the additional cost.

Unlike the farm problem of the United States, however, that of Canada is caused mainly by the country's location. Only Alaska in all of the United States faces a similar problem of long winters and short summers. At present, Canadian farms and ranches provide sufficient food for the people and a considerable exportable surplus of grain. Very little additional good farmland can now be brought under cultivation, however. Government scientists, recognizing the long-range problem, are conducting experimental farming in the Mackenzie River Valley in the far north and at several other locations. New strains of crops which mature quickly are being developed. Perhaps, by the time that the demand for food exceeds the supply, the

An aerial view of irrigated wheatfields in Alberta. The rich dark-brown soil in this region is excellent for raising wheat.



agricultural scientists will have developed ways of producing crops in northern areas.

## QUESTION BOX

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1. Why is most agriculture in Canada concentrated in the southern part of the nation?
2. In which area of Canada can the greatest variety of crops be grown? Why?
3. What is diversification in agriculture?
4. Why is it easy for farmers to use machines in the Prairie Provinces?
5. What happens at a grain elevator?
6. What advantage does the port of Churchill on Hudson Bay have over Port Arthur and Fort William on Lake Superior? What advantage do the latter ports have over Churchill?
7. How is flour made? How is the natural food value from wheat maintained in white flour?
8. Why do Canadian farmers who raise wheat also frequently raise some oats and barley?
9. Where can winter wheat be grown in Canada? How is this crop used? Why is more spring wheat grown?
10. Where are the main fruit-growing areas in Canada? What fruits are raised?
11. What is the largest source of farm income in Canada?
12. Where are the largest cattle ranches located? Where are the main centers for dairying?
13. Why is the region just east of the Rocky Mountains fairly dry? What is being done to make use of this land?
14. How does Canada's farm problem differ from that faced by the United States? What solutions have been found?





View of a pulpwood pile in Canada. Each log in the pile is about 4 feet long. Huge quantities of wood are needed to operate a large paper mill.

## FOREST INDUSTRIES

More than 40 per cent of Canada's land is forested. About half of these forests contain trees of sufficient size to use in producing lumber or wood pulp. With such vast timber resources, the products of forest industries annually are worth about two billion dollars and are the most valuable Canadian export. More than 300,000 Canadians make their living working in one of the forest or forest-related industries.

Several factors help explain why Canada's forest industries have developed to such an extent. First, the nation has about half of the pulpwood resources of North America, and a considerable amount of the continent's lumber-grade timber. Second, the many streams flowing from the interior are accessible routes on which the logs are inexpensively moved to sawmills. The streams also provide hydroelectric power for the mills. Third, a number of modern industries, in which wood pulp is used as the basic ingredient of the manufactured

product, have been developed. Fourth, industries in both Canada and the United States, particularly packaging companies and publishing firms, use vast quantities of paper.

In Canadian forests there are more than 150 different kinds of trees, more than three-fourths of them coniferous. Trees which are cut for the pulpwood industry include spruce, balsam, fir, jack pine, and hemlock. The most valuable lumber trees are spruce and the Douglas fir which grows in vast stands on the Coast Ranges of British Columbia.

The forest industries of Canada include five different kinds or types: (1) logging, or cutting the timber in the forest; (2) producing lumber; (3) making pulpwood and paper; (4) wood-using industries; and (5) paper-using industries.

**Logging.** In many areas of Canada, cutting the timber and hauling it to streams is a seasonal occupation concentrated





*Left.* Two lumberjacks, called "fallers," use a two-bladed axe in notching a large tree. It will be cut from the other side with a power saw. *Center.* A bulldozer pulls logs across rough land. *Right.* Logs on the way to a mill.

mainly in the autumn and winter months. When the snow melts in the early spring and water levels are high, the logs are sent downstream to the mills. Increasingly, however, logging operations are becoming a year-round activity. Particularly near the coast in British Columbia, where the mid-latitude marine climate prevails, logging goes on throughout the year.

Most of the work of cutting and hauling the logs in Canada is now done by machines. Automatic saws quickly fell the tree and trim it of limbs. Bulldozers are used to cut lumber roads through the forest, and cranes are used to lift the logs

onto huge trucks. Conveyor belts are used to stack logs in storage areas.

Some logging is done in every province of Canada. In Quebec, Ontario, New Brunswick, and Newfoundland, the timber is cut mainly to obtain pulpwood. Most of the timber cut in British Columbia, Alberta, and Nova Scotia, however, is made into lumber or shingles. All areas produce both lumber and pulpwood, however.

**Producing Lumber.** Lumber is cut at sawmills which usually are located near the mouths of rivers. Canadian mills annually cut about eight billion board feet of lumber, worth more than 500 million

Dynamite is sometimes used to free a log jam. It is used carefully so that no one will be injured and only a few logs will be damaged.







View of a lumber mill along a river in Canada. Why are most large lumber or paper mills located along rivers?

dollars. A board foot is a piece of lumber one foot long, one foot wide, and one inch thick. More than half of Canada's total amount of lumber is cut in British Columbia. Some of the sawmills in that province are so large that they process a half-million board feet of lumber daily.

**Making Pulpwood and Paper.** Canada's leading industry is making pulpwood and paper. The nation has more than 125 pulp and paper mills, most of them located in Quebec and Ontario. The total production of these mills each year is worth about one and one-half billion dollars. Paper products alone are worth almost a billion dollars annually. Paper is the main product of most of the mills. About eight million tons of paper are made annually, and newsprint is the most valuable product. As you know, newsprint is the kind of paper on

which newspapers are printed. Canada produces about half of the newsprint made in the world, and most of it is exported to the United States. In a recent year, more than six and two-thirds million tons of newsprint were made in Canadian mills, while about two million tons were produced in the United States. More than 760 million dollars were earned by exporting newsprint.

About one-fourth of the wood pulp production of Canada is exported, mostly to the United States. The wood pulp sold to other countries annually brings Canada about 350 million dollars.

**Wood-Using Industries.** Among the industries in Canada that manufacture wood products are those which make furniture, doors, veneer and plywood, and hardwood flooring. Other products made from wood include boxes, crates, barrels, handles, shoe



A British freighter is loaded with lumber in Vancouver Harbor, the most important Canadian port on the Pacific Coast. Most of the timber from the large spruce and fir trees that grow in the forests of British Columbia is made into planks or shingles.



# FORESTS OF CANADA

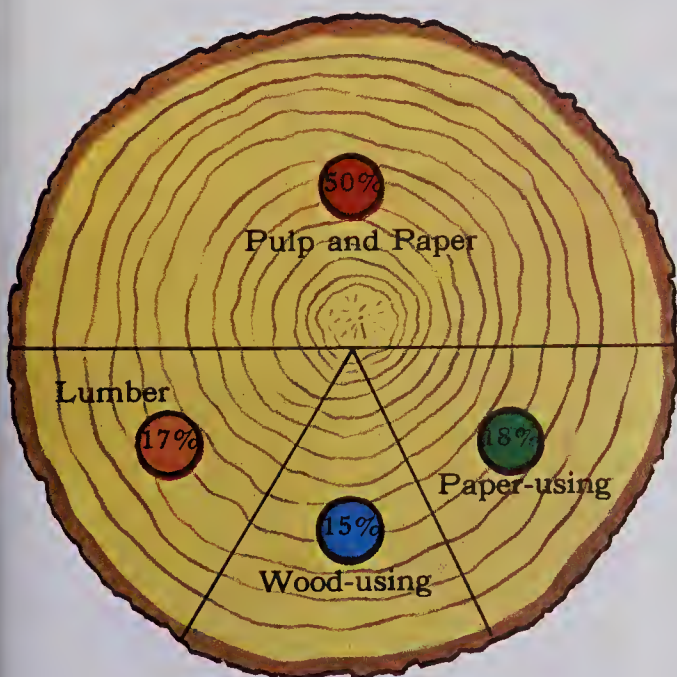
0 100 200 300 400

## LEGEND

- Douglas fir, spruce, cedar, hemlock .....
- Douglas fir, ponderosa, pines, spruce .....
- Spruce, balsam, poplar, white birch .....
- Spruce, balsam, pines, maple, birch .....
- Spruce, white birch (non-commercial) .....

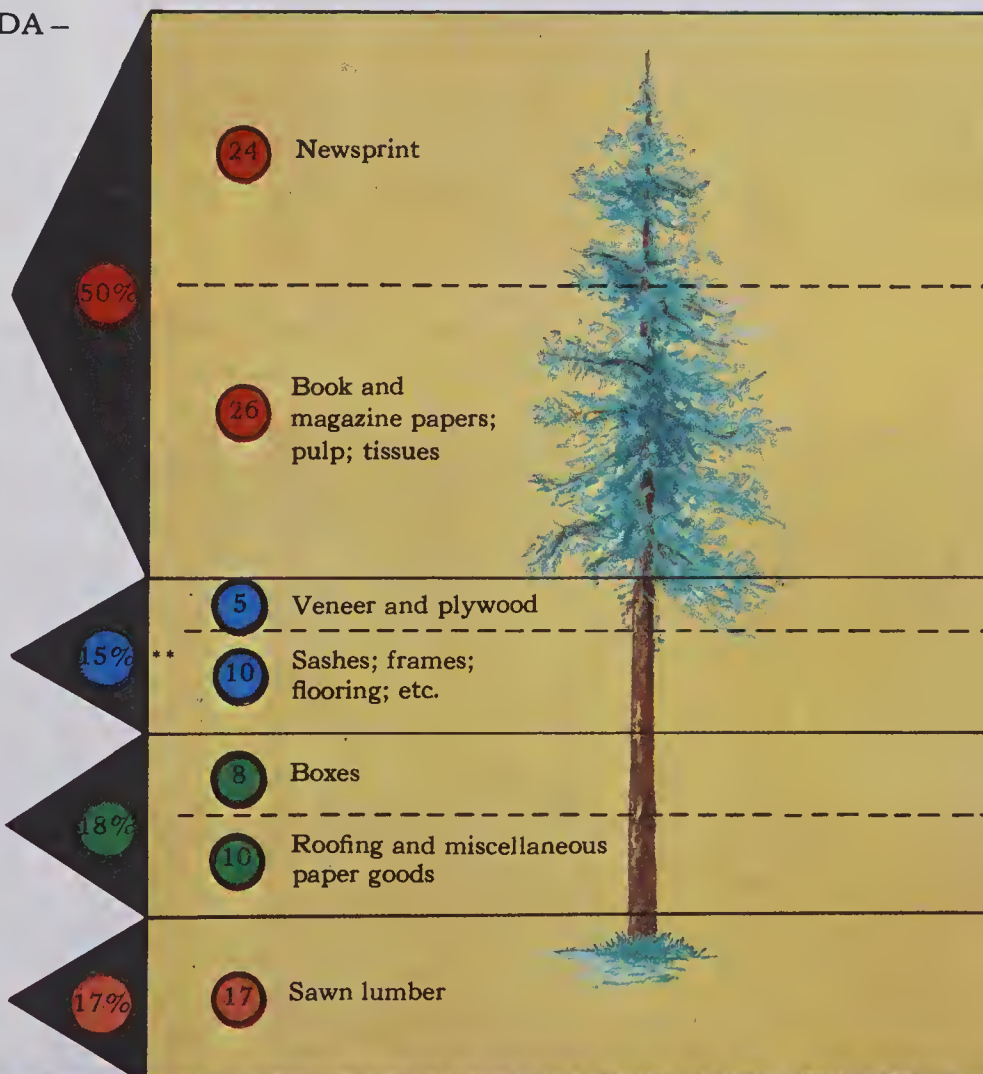
The map above shows the location of forest regions in Canada. The total value of goods produced by forest industries in Canada usually exceeds 3 billion dollars each year. Look at the diagram below. What percent of this total value is produced by the pulp and paper industry?

## FOREST INDUSTRY PRODUCTS OF CANADA - BY PERCENTAGE OF TOTAL VALUE\* (Excluding logging)



\*Figures are approximate for 1961

\*\*Excludes the furniture industries which now use only small amounts of wood.







Logs from a pile such as that shown on page 376, are carried into the mill by conveyor belts. Bark is knocked off the logs in a revolving drum. A stream of water washes the loosened bark away.

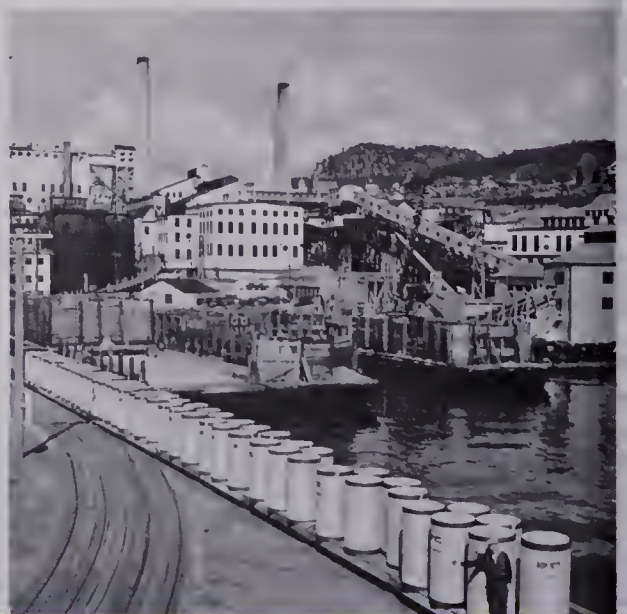
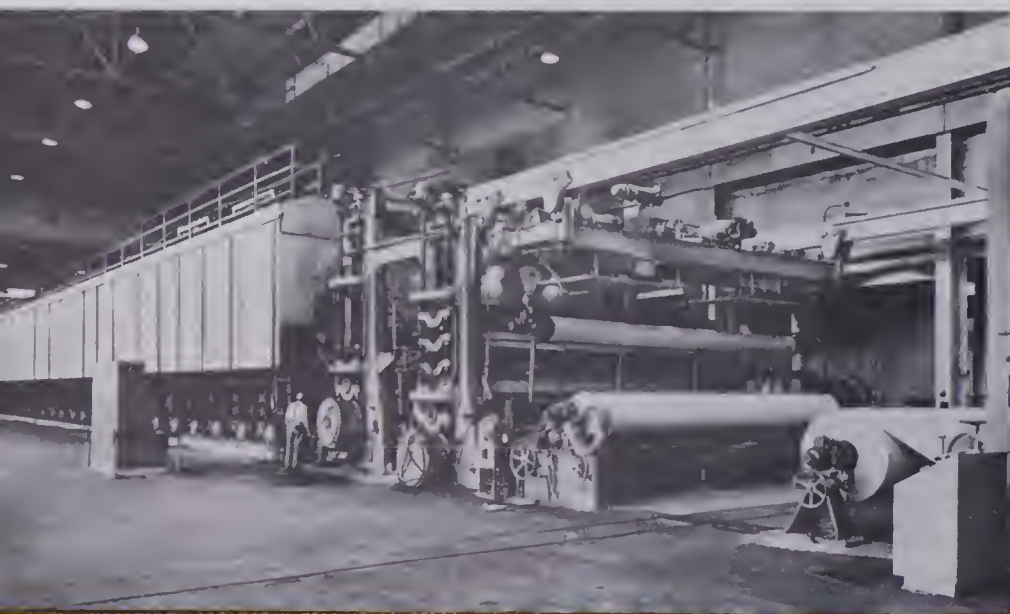
lasts, and excelsior. Many factories which make these products are small, but the combined production from all such companies is valued at more than one billion dollars annually.

**Paper-Using Industries.** Several industries in Canada make products out of paper. The largest of these, in terms of value of products, is the paper box and paper bag industry which has an annual output worth about 300 million dollars. Most of the products of this industry are used in packaging manufactured products. A number of factories make roofing paper, and others produce numerous kinds of paper goods such as napkins, paper towels, place mats,

and writing paper. Merchandise produced by these industries is worth another 225 million dollars annually.

**Protecting and Conserving Forest Resources.** Fortunately, Canadians are interested in protecting and using wisely their valuable forest resources. For many years, the government has been conducting educational campaigns in order to prevent the forest fires caused by carelessness. New techniques of spotting fires and fighting them have been developed. Airplanes often are used to carry men and their equipment to burning areas. Better estimates of forest resources also have been made through use of aerial photography.

*Left.* This newsprint paper-making machine, one of the largest in Canada, makes 2,500 feet of newsprint a minute. *Right.* Heavy rolls of paper, ready for shipment, line a dock outside a Canadian mill. Note the size of the man.







To make plywood, a thin sheet of wood called veneer is cut or "peeled" from a log by a special lathe. Several thicknesses of veneer will be coated with glue and bonded together by pressure and heat in giant presses.

Many forest engineers and forest rangers have been trained in Canadian universities and colleges. The Canadian government also has been helping to improve the forest industries of the nation. Research scientists have developed new products which can be manufactured from materials which previously were wasted.

As more than nine-tenths of the forests grow on government-owned land, it is to Canada's advantage to conserve them and to improve the forest industries. In spite of all these efforts, however, some regions with the best, easily reached timber in southern Ontario and Quebec and in British Columbia have been over-harvested. If Canada is to maintain forests to provide wood for future generations, more scientific logging will have to be done. Many areas in which there are no logging operations at present will need to be opened. Transportation costs may be increased somewhat because these areas are farther from main manufacturing centers, and nearby streams do not flow in the right direction. With good management, however, Canada's most valuable renewable resource should last forever, and should continue to provide raw material for the huge forest industries.



*Above.* This skilled wood-carver specializes in carving animals of Canada. *Below.* These men are setting out seedlings to replace the trees destroyed in a forest fire.







Dried cod is weighed on a dock in St. John's, Newfoundland. Most of the money made by Atlantic Coast fishermen comes from selling cod and lobsters.

## THE FISHING INDUSTRY

One of Canada's most valuable replaceable natural resources is fish. More than 80,000 Canadians make their living catching or trapping seafood. Although the value of the catch varies considerably from year to year, the industry catches and processes products which usually are worth about 200 million dollars annually. About nine-tenths of the processed seafood is exported, most of it to the United States.

**Atlantic Coast Fisheries.** As you have learned, the Grand Banks located south and east of Newfoundland are one of the best commercial fishing grounds in the world. The Grand Banks area is especially important for cod catches. In most years, Canadian fishermen catch almost 600 million pounds of cod off the Atlantic Coast.

For more than 300 years, many people in the Maritime Provinces have depended on fishing for their living. Throughout

most of that time, methods of catching and preserving the fish were changed little if at all. Many of the codfish were either salted or dried in the sun. When the frozen foods industry was developed, suddenly much larger quantities of codfish could be prepared for market. Today, frozen cod from the Maritime Provinces can be obtained in practically every grocery store in Canada and the United States in one of several forms. Probably the most popular form is the "fish stick," a small boneless fillet rolled in corn meal or bread crumbs and partially cooked before being frozen. Cod can be bought also in large or small chunks which have been frozen. Whole fresh-frozen cod are available in some markets.

Throughout the centuries, cod fishermen of Canada used ground-fishing techniques. Do you remember what these methods are



like? Generally, fishermen from Newfoundland and Nova Scotia went out to the banks in small boats. They dragged their nets along the ocean floor until they became heavy; then they raised the nets and emptied them into the boat. Because fish spoil quickly, the cod were cleaned and salted soon after they were caught. The industry thus required many hands, and although catches were large the catch per individual fisherman was small.

Very rapid changes have been taking place in the Atlantic Coast fisheries in recent years. Most of the small boats have given way to larger power-driven boats which are equipped with power-operated nets. The boats drag the nets along the ocean floor and empty them periodically and effortlessly into the ships' refrigerated holds. Within a few hours, instead of days or weeks, the fast boats deliver the catch to processing and freezing plants on shore. There, the fish are cleaned, packed several different ways, and frozen. Waste portions of the fish, instead of being thrown into the ocean, are dried and ground into meal for use as livestock feed or fertilizer.

Portions of the cod catch still are salted or dried. New ways of drying the cod in factories have speeded the process immensely. Most of the salted and dried cod-fish, as well as the frozen cod, is exported.

In addition to cod, haddock, halibut, herring, redfish, and mackerel are caught in large numbers along the Atlantic shores and on the banks. The most valuable catch of the Atlantic Coast fishermen in recent years, however, has been lobsters which are trapped in shallow water near the shore. Do you recall how lobsters are caught? Northumberland Strait, between New Brunswick and Prince Edward Island, is the finest lobster-trapping area. Fresh live lobsters are sent to market packed in ice. Clams and oysters, many of which are canned, are also obtained along the coast.



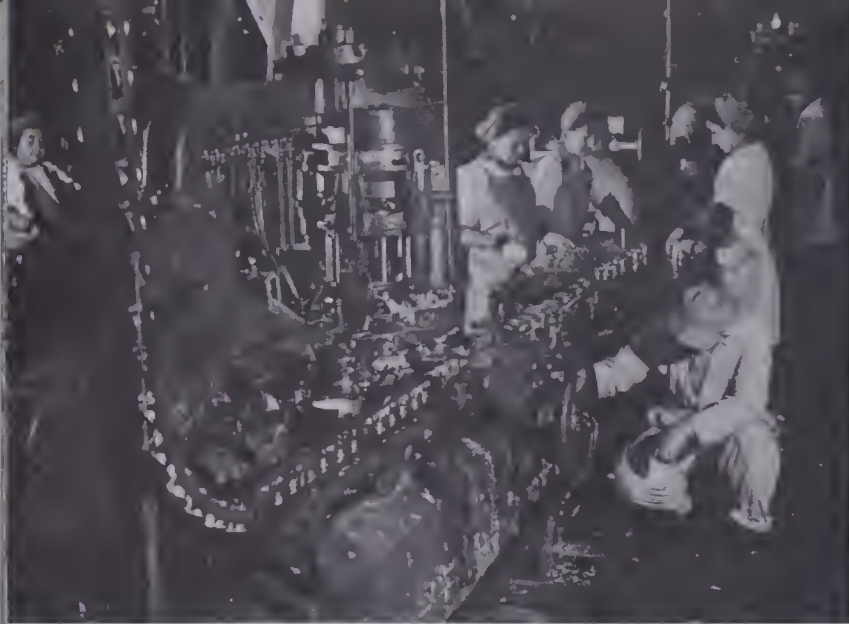
West coast salmon fishermen transfer a catch from a seine net to the ship's hold. Most salmon are caught in mid-summer.

**Pacific Coast Fisheries.** The Pacific Coast fishing industry in Canada is quite different from that of the Atlantic Coast. For centuries, Atlantic Coast fishermen operated their own boats, were responsible for their own nets, and blamed no one but themselves for good or poor catches. The west coast industry, by contrast, was developed primarily by large companies. The fishermen and other workers have been highly organized for many years, and frequently have struck for higher wages or better working conditions. As a result, the cost of obtaining herring, whales, and halibut—all of which are found in the North Pacific—has risen rapidly. At the same

Many lobsters are caught in the cold waters of the Gulf of St. Lawrence. These men are grading a lobster catch.







*Top.* A salmon cannery on the Pacific Coast. *Center.* A batch of canned salmon is inspected in a plant laboratory. *Below.* This chart shows the catch of major fish types made by fishermen of Canada and the United States.

#### FISH CATCH IN UNITED STATES AND CANADA-1962\*

(In 1,000 lbs.)

FISH	CANADA	UNITED STATES
Cod	591,701	46,000
Haddock	114,244	134,000
Mackerel	16,149	49,000
Salmon	167,612	317,000
Tuna	730	302,000
Herring (Sea)	681,155	197,000
Shrimp (and Prawns)	1,663	190,000
Lobster	46,277	28,000

\*Figures are approximate

time, other countries with low wage scales have been improving their fishing fleets in recent years. To protect its fishing grounds from foreign fleets, Canada announced in 1964 that it was extending its control over commercial fishing to twelve miles from its shores. However, Soviet and Japanese vessels will still be able to catch salmon and other fish beyond the twelve-mile limit.

The most valuable annual catch of Canadian fishermen usually is the salmon catch in the Fraser River area of British Columbia. However, in spite of measures to control the numbers of salmon caught, sometimes few salmon appear. The salmon fishing industry in British Columbia operates at a level much below capacity in such "off years." Better methods of protecting young salmon are needed.

**Lake Fishing.** Most of the thousands of lakes and streams in Canada contain fish. Lake trout, whitefish, and herring are caught commercially in the Great Lakes, Lake Winnipeg, and Great Slave Lake. These fish are, for the most part, sold fresh in the interior cities. Thousands of amateur fishermen also catch trout, whitefish, pike, pickerel, and perch in the rivers and lakes.

**International Fishing Agreements.** Because a number of countries have operated fishing fleets for many years on the Grand Banks, Canada has been a leader in developing international fishing agreements. The Canadian government holds membership on the International Commission for the Northwest Atlantic Fisheries, and has taken a lead in its activities. Agreements have also been worked out with the United States to preserve the salmon fishing industry in the Northwest and commercial fishing on the Great Lakes. The United States, Japan, and Canada have also signed agreements controlling fishing practices in the North Pacific, but the U.S.S.R. has not.



## THE FUR INDUSTRY

An important resource of Canada, ever since the country was first settled by Europeans, has been its valuable fur-bearing animals. In fact, it was the desire to make money in the fur trade that led many early pioneers to face the dangers and hardships of exploring most of this vast land. As you know, the Hudson's Bay Company began to maintain fur-trading posts in Canada early in the nation's history. The Company still is important in the fur industry. Today, the only two countries with a large industry based on wild, fur-bearing animals are the U.S.S.R. and Canada. Both have vast, forested, almost uninhabited areas in the far north.

The wild fur-bearing animals, such as the beaver, mink, muskrat, weasel, fox, ermine, and otter, live mostly in the forests north of the fiftieth parallel. The region west of Hudson Bay, especially, has many such animals. The long cold winters in this region cause the animals to grow heavy coats of fur. Fur trapping or hunting is usually done during the winter season when the fur is heaviest and in best condition. Winter also is the best time for men to travel along trap lines in the forest. During summer months, much of this area is boggy.

As a general rule, the fur trappers operate near main streams for two reasons.

First, many of the more desirable fur-bearing animals, such as the beaver, muskrat, and otter, live along streams. Second, the streams are good highways in winter, as their frozen, level surfaces make skiing or snowshoeing fairly easy. After the spring thaws, furs are transported on these waterways to fur-trading stations.

As large manufacturing industries have grown in Canada, the fur industry has become relatively less important. Many people in the northern part of Canada, including Indians, Eskimos, and white men, still make a living by trapping, however. Some of them live long distances from permanent settlements, traveling into them only occasionally for supplies. The wild, fur-bearing animals also are gradually disappearing as more of the land is cleared and used for farming. This trend has been partly offset by the creation of national parks where game is protected and by commercial farms which raise fur-bearing animals. Fur farming, which started on Prince Edward Island, has now spread into every province. At first the industry was limited to silver foxes, but now almost every species of fur-bearing animal is raised. Fur farming provides a steady income, and produces unusually fine furs because of the scientific care the animals receive.

**A Canadian Mountie bargains with Eskimos for seal meat for his dogs.**

**A trapper rests his team after a long trip to a fur-trading center in northern Ontario.**





## CANADA AND THE WORLD

Canada has many contacts with other nations, both in the Western Hemisphere and beyond it. Only four other nations surpass the annual Canadian record in the value of goods traded with other countries. These nations—the United States, Great Britain, West Germany, and France—have much greater populations, of course. Canada, therefore, is the leading trading nation in the world on a per capita basis.

For many years, Canada enjoyed a favorable **balance of trade**. In other words, the value of its exported goods exceeded the value of goods it imported. In recent years, primarily because of the very rapid expansion in industry, the balance of trade has been unfavorable. The reasons are quite simple to understand. Canada has been importing expensive machine tools, basic equipment for many new plants, automobile parts and engines, citrus fruits, and coal. It has been exporting newsprint, lumber, wood pulp, wheat, iron ore, fish, numerous mineral ores, aluminum, and some petroleum. Obviously the monetary value of the products imported was generally

greater than that of the exported products. Therefore, in recent years the Canadian government has been gradually going into debt. To the leaders of the government, this seemed wise because the nation was building for the future.

Whether Canada will soon again be able to achieve a favorable balance of trade is hard to predict. Canadian workers, like those in the United States, have achieved a high standard of living. Wages therefore are so high that production costs in Canada are among the highest in the world. Other countries needing agricultural or manufactured products try to buy the highest-quality products obtainable at the lowest prices. Workers in several other manufacturing countries, especially Japan and West Germany, receive much lower wages than do Canadian workers. Companies in these countries, therefore, underbid Canadian firms. Canada and the United States, which trade more with each other than with any other countries, could price themselves out of the world markets which both need. It will be interesting to see how

President Johnson and Canadian Prime Minister Pearson review an honor guard of Canadian and U.S. servicemen.





both governments attempt to solve their trading problems.

Canada has made up the difference between income and expenditures by obtaining capital from other countries, which then has been invested in Canadian stocks and bonds. One of the best ways for Canada to improve rapidly the balance of trade with the United States is to increase the number of tourists which visit Canada. As highways are improved in Canada, and as motel and hotel accommodations are expanded, more and more people from the United States probably will travel northward for summer vacations. Already the tourist business in Canada is thriving, with more than four million visitors from the United States each year who stay for more than two days. Recently, however, almost as many Canadian tourists have visited the United States. Moreover, they have actually spent more money south of the border than tourists from the United States did in Canada!

For many years Canada has taken a leading role in the United Nations and in NATO, the North Atlantic Treaty Organization. As a member of the Commonwealth of Nations, Canada has seemed at times to have more interest in the Eastern Hemisphere than in other areas of the Western Hemisphere. In United Nations debates, the positions taken by the Soviet Union and its satellites have often been challenged brilliantly by Canadian representatives. Canada's concern for African and Asian nations has been shown many times. Recently, however, Canada has begun to show more interest in the welfare of other Western Hemisphere nations and in the Organization of American States. Good economic reasons exist for more Canadian participation in Western Hemisphere trade. Latin America, generally, needs the goods which increasingly are being produced by Canadian factories and mines. Many of

the agricultural products which these countries export, such as cotton, coffee, and citrus fruits, are the very ones that Canadian farmers cannot raise because of the climate. For these and other reasons, it appears likely that the Canadian government soon may join the Organization of American States.

### QUESTION BOX

50

1. What is the most valuable export of Canada?
2. What reasons can be given to explain why the forest industries have grown so rapidly and have become so large?
3. Which are the most valuable trees in the Canadian forests?
4. Why are logging operations in some parts of Canada concentrated in the fall and winter months?
5. What is a board foot?
6. What paper and wood products are made in Canada? Which are the most valuable?
7. What has the Canadian government done to conserve its timber?
8. Why are the Grand Banks such a good fishing place?
9. How has the fishing industry on the Atlantic Coast changed in recent years?
10. What seafood brings Atlantic Coast fishermen the most income?
11. In what ways do Pacific Coast fisheries in Canada differ from those on the Atlantic Coast?
12. How has the fur industry in Canada changed in recent years?
13. Why has Canada's balance of trade been unfavorable in recent years? What steps have been taken by Canada to improve it?
14. Why may Canada soon join the Organization of American States?



## GLOBE AND MAP ACTIVITIES

1. What is the location in degrees and minutes of the North Magnetic Pole? The South Magnetic Pole?

2. Be prepared to locate quickly each of the following on a large wall map or on the globe: (a) Ellesmere Island; (b) the Mackenzie River Delta; (c) Lake Winnipeg; (d) St. Elias Mountains; (e) James Bay; (f) Hudson Strait; (g) Anticosti Island; (h) Gaspé Peninsula; (i) Ungava Peninsula; (j) Victoria Island; (k) Baffin Island; (l) Great Bear Lake; (m) Great Slave Lake; (n) Georgian Bay; (o) Bay of Fundy; (p) Strait of Belle Isle; (q) Cape Breton Island; (r) Davis Strait; (s) Devon Island; (t) Beaufort Sea; (u) Mackenzie Mountains; (v) Vancouver Island; (w) Queen Charlotte Island; (x) Foxe Basin; (y) Gulf of St. Lawrence; (z) Grand Banks.

3. Using the maps on pages 350-351 or 203, figure the distances between each of the following places by the most direct route: (a) Vancouver, British Columbia, and St. John's, Newfoundland; (b) Coppermine, Northwest Territories, and Windsor, Ontario; (c) Goose Bay, Labrador, and Dawson, Yukon Territory; (d) Ft. William, Ontario, and Quebec, Quebec; (e) Ottawa, and Washington, D. C.

4. Using the map on pages 350-351, be prepared to describe in considerable detail (1) what covers the ground during summer months; (2) what the summer and winter climates probably are like; and (3) the type of agriculture practiced, if any, at each of the following places: (a) near Calgary, Alberta; (b) near Toronto, Ontario; (c) near Churchill, Manitoba; (d) near the center of Ellesmere Island; (e) near Dawson, Yukon Territory.

5. Is Mexico City, Mexico, east or west of: (a) Regina, Saskatchewan? (b) Port Arthur, Ontario? (c) Winnipeg, Manitoba?

6. Is Havana, Cuba, east or west of: (a) Toronto, Ontario? (b) Windsor, Ontario? (c) Sault Ste. Marie, Ontario?

7. Is St. John's, Newfoundland, east or west of: (a) Caracas, Venezuela? (b) Recife, Brazil? (c) Buenos Aires, Argentina?

8. Is Vancouver, British Columbia, east or west of: (a) Juneau, Alaska? (b) San Francisco, California? (c) Los Angeles, California?

9. If you wanted to fly from Edmonton, Alberta, to each of the following places using the shortest route, describe the route you would take: (a) London, United Kingdom; (b) Stockholm, Sweden; (c) Moscow, U.S.S.R.; (d) Peking, China.

10. What is the shortest possible sea route between St. John's, Newfoundland, and Vancouver, British Columbia? Has this route ever been used by any vessels?

11. Which is farther north: (a) Windsor, Ontario, or Paris, France? (b) Ottawa, Ontario, or Rome, Italy? (c) Winnipeg, Manitoba, or London, United Kingdom? (d) Edmonton, Alberta, or Moscow, U.S.S.R.? (e) Churchill, Manitoba, or Oslo, Norway? (f) Norman Wells, Northwest Territories, or Reykjavik, Iceland? (g) Toronto, Ontario, or Minneapolis, Minnesota?

12. Be prepared to locate on a large wall map each of the following rivers: (a) Mackenzie; (b) Red River of the North; (c) St. Lawrence; (d) Fraser; (e) Saskatchewan; (f) Nelson; (g) Saguenay; (h) Niagara; (i) Peace; (j) Athabaska; (k) Columbia.

13. Which country or countries on the North American continent: (a) Has the longest coastline? (b) Has coastlines on three oceans? (c) Has the largest inland bay? (d) Has the largest inland lake? (e) Has the largest offshore island? (f) Has two separate parts on the continent separated by part of another country? (g) Extends the farthest east? (h) Extends the farthest south?

14. Which of each of the following pairs of cities has average colder temperatures during January: (a) Vancouver, British Columbia, or Toronto, Ontario? (b) Banff, Alberta, or Winnipeg, Manitoba? (c) Anchorage, Alaska, or Edmonton, Alberta? (d) St. John's, Newfoundland, or Winnipeg, Manitoba? (Note: the table giving climate conditions will be helpful in this activity.) How can you explain why some places have colder temperatures than other places farther north?



## OTHER LEARNING ACTIVITIES

1. Make a special study of magnetism and report your findings to the class. Explain clearly why compasses point to the magnetic poles.

2. Join a group to learn all you can about the Eskimos of northern Canada. Be sure that you get the most recent information about them that you can find in the library. Make a report to the class, using visual aids if possible.

3. Join a group to learn all you can about the DEW line which the United States and Canada have constructed across the northern part of the North American continent. Try to answer questions such as: (a) What function does it serve? (b) Why was it placed there? (c) How were the separate stations constructed? (d) Who mans the stations? Report your findings to the class.

4. Locate information about the "Biggest Country Fair" in the world—the Canadian National Exhibition held annually in Toronto. Report your findings to the class.

5. Join a group which will prepare both a written and an oral report on one of the following topics: (a) The Hudson's Bay Company and the History of Canada; (b) Queen Elizabeth II and the Government of Canada; (c) Animals of Canada's Northern Forests; (d) Uranium Mining in Canada; (e) Nickel, Its Uses in Industry; (f) Asbestos, the Different Mineral; (g) The Alaska Highway; (h) The St. Lawrence Seaway; (i) Niagara Falls; (j) Major Cities of Canada.

6. Locate information about the Gander and Goose Bay airports. Also learn about polar air routes from Los Angeles to Europe, and other polar routes to the Far East. Report on your findings.

7. Write a biographical sketch of one of the following men, each of whom has been important in the history of Canada, or of another Canadian of your own choosing: (a) E. L. M. Burns; (b) Jacques Cartier; (c) Samuel de Champlain; (d) John G. Diefenbaker; (e) Comte de Frontenac; (f) Louis Joliet; (g) W. L. Mackenzie King; (h) Sieur de La Salle; (i) Sir John A. Macdonald; (j)

Sir Alexander Mackenzie; (k) Jacques Marquette; (l) Vincent Massey; (m) Marquis de Montcalm; (n) Lester B. Pearson; (o) Louis S. Laurent; (p) George Philias Vanier; (q) James Wolfe.

8. Prepare a series of charts for the bulletin boards in the room showing each of the following: (a) The provinces ranked in order from largest to smallest, the area in square miles of each, and the provincial capital (Include the territories at the bottom of the chart); (b) The provinces and territories arranged in order of population size from largest to smallest, with the population of each given; (c) Major exports of Canada in the most recent year for which figures are available, arranged according to value from highest to lowest, with the value of each in dollars; (d) Major imports of Canada, showing the same information as in (c) above; (e) Major manufacturing industries and the value of products made; (f) Major agricultural sources of income and the value of each. You will need sources such as *Canada, 19—*, The Official Handbook of Present Conditions and Recent Progress prepared by the Canada Year Book Section, Information Services Division, Dominion Bureau of Statistics, Ottawa; *The Economic Almanac* published for The National Industrial Conference Board by Thomas Y. Crowell Co., New York; atlases, and almanacs to obtain the information you will need.

9. Prepare a chart which lists all the nations of the Western Hemisphere alphabetically. Then, in two columns after each nation, give its rank in the size of its land area and population. In the third column give a brief description of the climate. In the fourth column, list the nation's capital. In the fifth column, list major agricultural products. In the sixth column, list major manufactured products, if any. In the seventh column, list any major generalizations possible about ways of living in the country.

10. Compare the size of the five largest cities in the United States and the five largest cities in Canada. A chart or graph might be a good way to show the comparison.





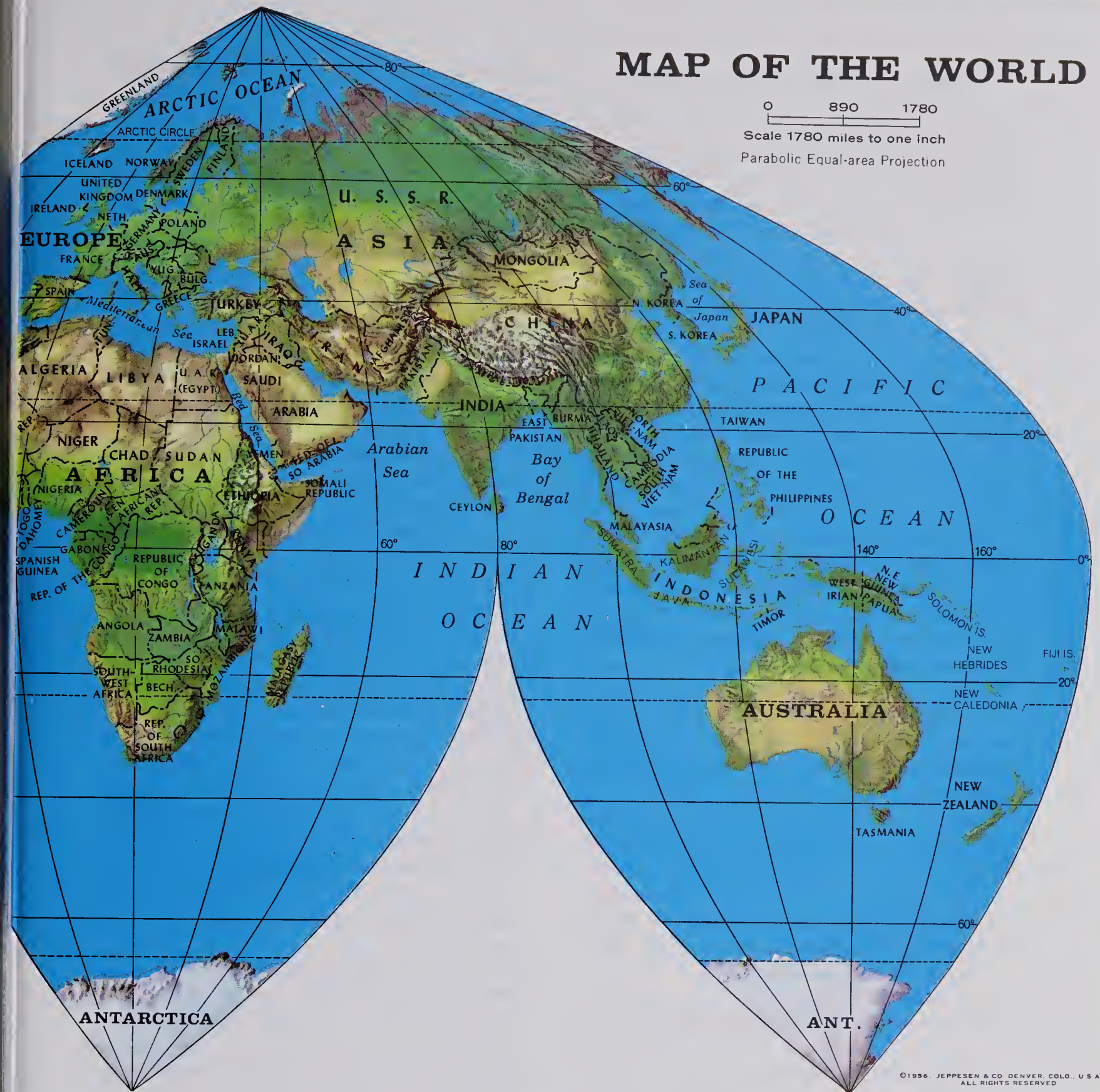


# MAP OF THE WORLD

0 890 1780

Scale 1780 miles to one inch

Parabolic Equal-area Projection



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to the same area on a globe. Notice that parallels are shown as straight lines on this map and that meridians are curved. Lines curved like 40° West and 80° East are called parabolas. They are *parabolic* lines. Do you see why this map is called a Parabolic Equal-area Projection? Which continent does not appear to be a continent on this map? What large island is cut into two parts?



## GEOGRAPHICAL TERMS

### Terms about Agriculture

**Bush Rotation.** A system of farming which includes: (1) clearing forest land; (2) farming the land for a few years; (3) allowing the land to lie fallow or idle for a number of years so that it grows wild plants and trees again; (4) clearing the land again, usually by burning the vegetation.

**Commercial Agriculture.** Farming carried on for the purpose of making money, usually using hybrid seeds, farm machinery, fertilizers, and insecticides.

**Experiment Stations.** Farms on which scientific tests are carried on to try new farming methods, to improve livestock, and to produce better seeds, machinery, fertilizers, and insecticides.

**Hybrid.** A crossbred plant or animal; usually developed by agricultural scientists to produce a stronger or better strain, or a strain that is more adaptable to environmental conditions.

**Money Crops.** Crops which are raised primarily for sale, such as cotton, coffee, tobacco.

**Nitrogen-fixing Plants.** Plants such as soybeans and peas, which absorb nitrogen from bacteria living on their roots and which deposit the nitrogen in the soil when the plants decay, thereby enriching it.

**Plantations.** Large farms operated commercially, usually to produce a limited number of crops, with much or most of the work performed by employees.

**Subsistence Agriculture.** Farming carried on to raise only enough food and fiber for the farmer's family.

### Terms about Government

**Communist Government.** A government controlled by the Communist Party in which businesses, industries, and land are owned and operated by the government.

**Dictatorship.** Type of government controlled by one all-powerful man whose authority is supreme.

**Federal.** Of or pertaining to a union of states under a central government with the states retaining certain rights and the central government having certain responsibilities.

**Legislature.** The law-making body of a republic or a state.

**Province.** An administrative part of a country; usually has some voice in its government.

### Terms about Industries

**Automation.** A method or technique of controlling a mechanical process automatically, usually by electronic devices.

**Electronics.** A science that deals with the use and control of free electrons in vacuum tubes, transistors, and the like.

**Industrial Center.** A city or an area in which there are many manufacturing plants, usually located there for reasons such as available raw materials, power, and ease of transportation.

**Refining.** Process of removing impurities from an ore or other material so that the desired product is pure or has a higher degree of purity.

**Smelting.** Refining by using heat to melt an ore. Chemicals or other ores are often added during smelting to purify or bring about changes in the product.

**Synthetic.** Man-made through chemistry. Materials from petroleum, for example, can be combined to form a synthetic product which resembles natural rubber.

### Terms about Land

**Alluvial Soil.** Soil which has been carried by streams from higher elevations and deposited by them in valleys or near their mouths.



**Basin.** A region in which the land and its underlying rock strata dips from all directions to a central point and is largely surrounded by higher land.

**Coral Reef.** A ridge of limestone deposited by coral polyps and extending upward from the ocean floor to, almost to, or above, the surface of the water.

**Cordilleran System.** The ranges of mountains, reaching from Alaska to the southern tip of South America, which are generally parallel to the Pacific Coast.

**Earthquake.** A shaking or trembling of the Earth's crust caused by slippage along a fault, or by the folding of rock strata.

**Erosion.** The wearing away of the Earth by water, wind, frost, and other forces.

**Fault.** A break or crack in the Earth's crust.

**Glacier.** A large mass of ice which, because of its weight, moves slowly down a mountain or valley.

**Land Features.** The form or contour of the land in an area; the topography; the location of mountains, rivers, lakes, cities, etc.

**Leaching.** The process by which minerals needed for plant growth are drained from the soil in areas which have a great deal of rainfall. May also occur where soil is very porous.

**Lowlands.** A part of a country or region in which most of the land has little altitude or is considerably lower than the land which surrounds it.

**Plain.** Rather level land, sometimes with a few rolling hills. Usually of fairly limited altitude and of considerable extent.

**Plateau.** A high plain, often located between mountain ranges, and crossed by streams or canyons. Sometimes called tableland.

**River Basin.** The land area which is drained by a river and its tributaries.

**Selvas.** Extensive forested region of the Amazon river basin.

**Topography.** A detailed description of the surface or land features of an area, including both location and altitude.

**Watershed.** The ridge that divides one drainage area from another. Also, the area or region that drains into or supplies a river or lake.

## Terms about Maps, Globes, Location

**Grid.** A system of crossing lines used on maps and globes to help in locating places on the Earth. The crossing parallels of latitude and meridians of longitude form the "squares" in the grid.

**Latitude.** Distance north or south of the equator, measured in degrees. Each degree of latitude on the Earth equals about 69.1 statute miles.

**Longitude.** Distance east or west of the prime meridian, measured in degrees. At the equator, a degree of longitude equals about 69.1 statute miles. Near the poles, it equals only a few feet.

**Meridians.** North and south lines drawn on globes and maps which cross the equator at right angles. Each meridian is half of a great circle. On globes, meridians meet at both poles and are farthest apart at the equator.

**Panhandle.** General term used to describe a long narrow piece of land which extends from the rest of an area like the handle of a pan. (See map of Oklahoma.)

**Parallels.** East and west lines drawn on globes and maps parallel to the equator. Parallels are numbered from 0° (the equator) to 90° North or South (the poles).

**Rural.** In the country — not in a city. In the United States, towns with fewer than 2,500 people are considered rural.

**Urban.** In the city — not in the country. In the United States, cities with 2,500 or more people are considered urban.

## Terms about Trade and Commerce

**Artery.** A main transportation route such as a major highway.

**Balance of Trade.** The difference between the cost of imported goods and the money received for goods exported within a period of time. A favorable balance of trade is one in which income from exported goods is greater than the cost of imported goods.

**Capital.** Accumulated wealth which can be used to start new industries and to operate and enlarge industries already started.



**Cooperative.** A marketing agency usually established and controlled by farmers to market their farm produce. Members receive profits based upon their share of total production.

**Credit.** Trusting a person or company to pay in the future for goods or services needed and purchased now.

**Economy.** The arrangement and management of the producing, distributing, and consuming affairs of a community or nation.

**Heartland.** A rich, productive area of a country; usually related to both industrial and agricultural production.

**Inflation.** A rapid rise in the cost of goods or services and, therefore, in the cost of living with a corresponding drop in the purchasing power of money.

**Natural Resources.** Resources such as soil, water, forests, minerals, and living things which can be used in making products.

**Raw Materials.** Substances that are still in their natural state which can be used in producing other goods.

**Tariffs.** Taxes placed on goods imported or exported.

#### Terms about Water

**Bay.** A portion of a sea or ocean, usually much smaller than a gulf, which extends into the land and is partly surrounded by land.

**Breakwater.** A structure built to protect a harbor or beach which breaks the force of the waves.

**Estuary.** The very wide mouth of a river which has tides as oceans and seas do, and where fresh water and salt water mix.

**Gulf.** A portion of a sea or ocean which extends into the land and is partly surrounded by land; larger than a bay.

**Navigable River.** A river which has a channel or passageway deep or wide enough for the safe passage of ships. Some rivers are navigable throughout the year, others only during certain seasons.

**Ocean.** The entire body of salt water which covers nearly three-fourths of the Earth's surface, and which surrounds the continents of the Earth.

**Sea.** A smaller division of an ocean, especially if partly surrounded by land.

**Strait.** A narrow waterway which connects two larger bodies of water.

#### Terms about Weather, Climate, Seasons, Ground Cover

**Arid.** Dry; having too little rainfall for agriculture without irrigation.

**Climate.** The average weather conditions of a place or region throughout the year.

**Drought.** A long period of time with little or no rainfall; common in arid areas.

**Equinox.** The days each year when the sun's rays shine directly over the equator so that day and night are of equal length everywhere on the Earth. In the Northern Hemisphere the Vernal Equinox occurs about March 21 and the Autumnal Equinox about September 22.

**High Pressure Areas.** Areas where air has cooled, compressed, and settled toward the Earth causing high barometric pressure. High pressure generally means that several days of fair weather will follow.

**Hurricane.** Tropical cyclones (huge, whirling low-pressure cells) which average about 400 miles in diameter and have winds of more than 75 miles per hour.

**Low Pressure Areas.** Areas of low barometric pressure caused by warming, expansion, and rising of air or by merging highs of different temperatures.

**Solstice.** The times each year when the direct rays of the sun reach farthest north and south and, thus, are directly over either the Tropic of Cancer or the Tropic of Capricorn. On the day of the Summer Solstice in the Northern Hemisphere, the sun's rays shine directly down on the Tropic of Cancer and the entire area within the Arctic Circle has 24 hours of sunlight. The entire area within the Antarctic Circle has 24 hours without sunlight that same day.

**Trade Winds.** Winds in low latitudes which blow almost continually from the northeast in the Northern Hemisphere and from the southeast in the Southern Hemisphere toward the equator.



## APPENDIX

**TABLE I**  
**THE SIZE OF THE EARTH**

Diameter of the earth at the equator (miles)	7,927
Distance around the earth at the equator (miles)	24,902
Land area (square miles)	57,365,950
Water area (square miles)	139,585,122
Total area (square miles)	196,951,072

(Figures are approximate.)

SOURCE: *World Almanac 1964*

**TABLE II**  
**AREA AND POPULATION OF THE CONTINENTS**

CONTINENT	APPROXIMATE AREA (THOUSANDS OF SQUARE MILES)	ESTIMATED POPULATION (1961) (THOUSANDS)	POPULATION (PER SQUARE MILE)
Africa	11,724	251,000	22.2
Antarctica	6,000	Uninhabited	—
Asia, excluding U.S.S.R.	10,401	1,721,000	165.5
Australia	2,974	10,508	3.6
Europe, excluding U.S.S.R.	1,913	430,000	224.7
New Zealand and Pacific Islands	330	6,482	19.6
North America	9,362	273,000	29.2
South America	6,870	149,000	21.7
U.S.S.R.	8,651	218,000	25.2
World	58,225	3,069,000	52.7

SOURCE: *Information Please Almanac 1964*

**TABLE III**  
**HIGHEST MOUNTAIN PEAKS OF THE WESTERN HEMISPHERE**

MOUNTAIN	LOCATION	HEIGHT (FEET)
<b>South America</b>		
Anconcagua	Argentina	22,834
Bonete	Argentina	22,546
Huascarán	Peru	22,205
Mercedario	Argentina	22,211
Ojos del Salado	Argentina-Chile	22,539
Pissis	Argentina	22,241
Tupungato	Argentina-Chile	22,310
<b>Mexico, Central America, and the West Indies</b>		
Citlaltepec (Orizaba)	Mexico	18,700
Iztaccihuatl	Mexico	17,343
Popocatepetl	Mexico	17,887
<b>North America</b>		
Foraker	United States (Alaska)	17,400
Logan	Canada	19,850
Lucania	Canada	17,147
McKinley	United States (Alaska)	20,320
North	United States (Alaska)	19,470
St. Elias	Canada-United States	18,008

SOURCE: *World Almanac 1964*



**TABLE IV**  
MAJOR RIVERS OF THE WESTERN HEMISPHERE

RIVER	APPROXIMATE LENGTH (MILES)	OUTFLOW
<b>South America</b>		
Amazon	3,912	Atlantic Ocean
Japurá	1,500	Amazon River
Madeira	2,012	Amazon River
Negro	1,400*	Amazon River
Orinoco	1,281	Atlantic Ocean
Paraguay	1,584	Paraná River
Paraná	2,795	Río de la Plata (Atlantic Ocean)
Pilcomayo	1,242	Paraguay River
Purús	1,993	Amazon River
São Francisco	1,987	Atlantic Ocean
Tocantins	1,677	Pará River (Atlantic Ocean)
<b>North America</b>		
Arkansas	1,450	Mississippi River
Colorado	1,440	Gulf of California
Columbia	1,214	Pacific Ocean
Mackenzie	2,635	Beaufort Sea (Arctic Ocean)
Mississippi-Missouri-Red-Rock	3,860	Gulf of Mexico
Nelson	1,600	Hudson Bay
Ohio-Allegheny	1,306	Mississippi River
Rio Grande	1,885	Gulf of Mexico
St. Lawrence	1,900	Gulf of St. Lawrence
Saskatchewan	1,205	Lake Winnipeg
Yukon	2,300	Bering Sea

SOURCE: *Information Please Almanac 1964* except as noted  
\**World Almanac 1964*

**TABLE V**  
LARGEST LAKES OF THE WESTERN HEMISPHERE

LAKE	AREA (SQ. MI.)	LENGTH (MILES)	DEPTH (FEET)	ELEVATION (FEET)	LOCATION
<b>South America</b>					
Maracaibo	6,300	100	102	0	Venezuela
Titicaca	3,200	110	1,002	12,506	Bolivia-Peru
<b>North America</b>					
Athabasca	3,120	208	407	699	Canada
Dubawnt	1,600	69	—	774	Canada
Erie	9,930	241	210	572	U.S.-Canada
Great Bear Lake	12,275	232	450	512	Canada
Great Salt Lake	1,500	75	15/25*	4,200	United States
Great Slave Lake	10,980	298	2,015	512	Canada
Huron	23,010	206	750	579	U.S.-Canada
Lake of the Woods	1,695	72	69	1,060	U.S.-Canada
Manitoba	1,817	140	12	812	Canada
Michigan	22,400	307	923	579	United States
Nettilling	1,956	67	—	100	Canada
Nicaragua	3,100	100	230	105	Nicaragua
Nipigon	1,870	72	540	852	Canada
Ontario	7,520	193	780	246	U.S.-Canada
Reindeer	2,465	143	—	1,150	Canada
Superior	31,820	350	1,333	602	U.S.-Canada
Winnipeg	9,464	266	60	713	Canada
Winnipegosis	2,105	141	38	833	Canada

SOURCE: *World Almanac 1964* except as noted  
\**Information Please Almanac 1964*



**TABLE VI**  
AREA AND POPULATION OF COUNTRIES OF THE WESTERN HEMISPHERE

COUNTRY	AREA (SQUARE MILES)	ESTIMATED POPULATION (THOUSANDS)	YEAR	POPULATION PER SQUARE MILE	CAPITAL CITY	ESTIMATED POPULATION (THOUSANDS)
<b>South America</b>						
Argentina	1,072,700	21,079	1961	20	Buenos Aires	3,799
Bolivia	416,040	3,549	1962	8	La Paz	347
Brazil	3,286,270	75,271	1962	23	Brasília	142
British Guiana	83,000	582	1961	7	Georgetown	73*
Chile	286,396	8,036	1962	28	Santiago	1,915
Colombia	439,520	14,769	1962	34	Bogotá	1,200
Ecuador	116,270	4,596	1962	40	Quito	277
French Guiana	35,135	31	1960	1	Cayenne	19*
Paraguay	157,000	1,857	1962	12	Asunción	210
Peru	514,059	10,365	1961	20	Lima	1,730
Surinam	55,400	308	1961	6	Paramaribo	107*
Uruguay	72,172	2,827	1960	39	Montevideo	1,200
Venezuela	352,150	7,872	1962	22	Caracas	1,336
<b>Central America and Mexico</b>						
British Honduras	8,867	90	1960	10	Belize	33*
Costa Rica	23,421	1,275	1962	54	San José	158
El Salvador	8,259	2,810	1962	340	San Salvador	453
Guatemala	42,042	4,017	1962	96	Guatemala City	400
Honduras	44,482	1,950	1962	44	Tegucigalpa	125
Mexico	758,259	37,233	1962	49	Mexico City	4,829
Nicaragua	57,145	1,578	1962	28	Managua	177
Panama	28,576	1,139	1962	40	Panama City	200
<b>West Indies</b>						
Bahamas	4,404	108	1961	25	Nassau	55*
Cuba	44,206	7,068	1962	160	Havana	1,158
Dominican Republic	19,333	3,205	1962	166	Santo Domingo	367
Haiti	10,714	4,346	1962	406	Port-au-Prince	200
Jamaica	4,411	1,641	1961	372	Kingston	123*
Puerto Rico	3,435	2,350	1960	684	San Juan	589
Trinidad-Tobago	1,864	871	1961	467	Port of Spain	92*
Virgin Islands	133	32	1960	240	Charlotte Amalie	13
<b>The United States and Canada</b>						
United States	3,615,211	190,000	1963	53	Washington, D.C.	2,002
Canada	3,851,809	18,896	1963	5	Ottawa	430

SOURCE: *World Almanac 1964* except as noted

\**Information Please Almanac 1964*

**TABLE VII**  
SELECTED STATISTICS ON THE WESTERN HEMISPHERE

Highest mountain	Mount Anconcagua, Argentina	22,834 ft.
Lowest elevation (on land surface)	Death Valley, California	-282 ft.
Largest lake	Lake Superior, U.S.A.-Canada	31,820 sq. mi.
Longest river	Amazon	3,900 mi.
Highest waterfall	Angel Falls, Venezuela	3,212 ft.
Largest island	Greenland	840,000 sq. mi.
Highest recorded temperature (in shade)	Death Valley, California	134° F.
Lowest recorded temperature	Rogers Pass, Montana	-70° F.
Maximum average annual rainfall	Mount Waialeale, Island of Kauai, Hawaii	472 in.
Minimum average annual rainfall	Arica, Chile (43 yr. average)	0.02 in.*
Highest dam	Oroville, United States	735 ft.
Tallest building	Empire State, New York City	1,472 ft.
Largest city (in area)	Los Angeles, California	455 sq. mi.
Largest city (in population)	New York City, New York	7,781,984

SOURCE: *World Almanac 1964* except as noted

\**Information Please Almanac 1964*



**TABLE VIII**  
AREA AND POPULATION OF STATES IN THE UNITED STATES

STATE	AREA IN SQUARE MILES*	POPULATION (1960 CENSUS)	STATE	AREA IN SQUARE MILES*	POPULATION (1960 CENSUS)
Total for 50 States	3,615,211	179,323,175	Missouri	69,686	4,319,813
Alabama	51,609	3,266,740	Montana	147,138	674,767
Alaska	586,400	226,167	Nebraska	77,227	1,411,330
Arizona	113,909	1,302,161	Nevada	110,540	285,278
Arkansas	53,104	1,786,272	New Hampshire	9,304	606,921
California	158,693	15,717,204	New Jersey	7,836	6,066,782
Colorado	104,247	1,753,947	New Mexico	121,666	951,023
Connecticut	5,009	2,535,234	New York	49,576	16,782,304
Delaware	2,057	446,292	North Carolina	52,712	4,556,155
District of Columbia	69	763,956	North Dakota	70,665	632,446
Florida	58,560	4,951,560	Ohio	41,222	9,706,397
Georgia	58,876	3,943,116	Oklahoma	69,919	2,328,284
Hawaii	6,424	632,772	Oregon	96,981	1,768,687
Idaho	83,557	667,191	Pennsylvania	45,333	11,319,366
Illinois	56,400	10,081,158	Rhode Island	1,214	859,488
Indiana	36,291	4,662,498	South Carolina	31,055	2,382,594
Iowa	56,290	2,757,537	South Dakota	77,047	680,514
Kansas	82,264	2,178,611	Tennessee	42,244	3,567,089
Kentucky	40,395	3,038,156	Texas	267,339	9,579,677
Louisiana	48,523	3,257,022	Utah	84,916	890,627
Maine	33,215	969,265	Vermont	9,609	389,881
Maryland	10,577	3,100,689	Virginia	40,815	3,966,949
Massachusetts	8,257	5,148,578	Washington	68,192	2,853,214
Michigan	58,216	7,823,194	West Virginia	24,181	1,860,421
Minnesota	84,068	3,413,864	Wisconsin	56,154	3,951,777
Mississippi	47,716	2,178,141	Wyoming	97,914	330,066

SOURCES: \*Statistical Abstract of the United States 1963  
World Almanac 1964

**TABLE IX**  
AREA AND POPULATION OF PROVINCES AND TERRITORIES IN CANADA

PROVINCE	AREA IN SQUARE MILES	POPULATION (1961 CENSUS)
Total for 10 Provinces and 2 Territories	3,851,809	18,238,247
Alberta	255,285	1,331,944
British Columbia	366,255	1,629,082
Manitoba	251,000	921,686
New Brunswick	28,354	597,936
Newfoundland	156,185	457,853
Northwest Territories	1,304,903	22,998
Nova Scotia	21,425	737,007
Ontario	412,582	6,236,092
Prince Edward Island	2,184	104,629
Quebec	594,860	5,259,211
Saskatchewan	251,700	925,181
Yukon Territory	207,076	14,628

SOURCE: Canada 1963



**TABLE X**  
CLIMATE CONDITIONS IN SELECTED WEATHER STATIONS OF THE WESTERN HEMISPHERE

STATION AND COUNTRY	LATITUDE	LONGITUDE	ALTI- TUDE FEET	AVERAGE TEMPERATURE			MAX- IMUM ° F.	MIN- IMUM ° F.	AVERAGE PRECIPITATION		
				JAN. ° F.	JULY ° F.	ANNUAL ° F.			JAN. INCHES	JULY INCHES	ANNUAL INCHES
North America											
Anchorage, Alaska	61° 13' N.	149° 50' W.	132	12	57	35	92	- 36	0.8	1.6	14.3
Banff, Alberta	51° 25' N.	115° 30' W.	4,521	13	57	36	93	- 10	1.4	2.5	20.7
Barrow, Alaska	71° 23' N.	156° 17' W.	13	- 17	40	10	78	- 56	0.2	.9	4.3
Bermuda (St. George)	32° 18' N.	64° 46' W.	150	77	78	70	93	68	4.4	4.6	57.4
Boston, Massachusetts	42° 20' N.	71° 9' W.	124	27	71	49	104	- 18	3.4	3.3	38.9
Bridgetown, West Indies	13° 8' N.	59° 36' W.	181	78	80	79	91	61	3.4	5.1	54.8
Chicago, Illinois	41° 30' N.	87° 24' W.	610	25	75	50	109	- 20	1.8	3.1	31.8
Colon, Panama	9° 22' N.	79° 54' W.	10	80	80	80	95	66	3.9	16.2	129.4
Columbus, Ohio	39° 56' N.	82° 56' W.	918	29	75	52	106	- 20	2.9	3.5	34.1
Corpus Christi, Texas	27° 49' N.	97° 25' W.	20	56	82	70	105	11	1.1	1.8	25.5
Denver, Colorado	39° 32' N.	105° 0' W.	5,292	30	72	50	105	- 29	0.3	1.6	14.0
Edmonton, Alberta	53° 33' N.	113° 30' W.	2,158	6	61	38	98	- 29	0.9	3.4	17.3
El Paso, Texas	31° 47' N.	106° 30' W.	3,762	45	81	63	106	- 5	0.4	1.6	8.6
Fort Good Hope, Northwest Ter.	66° 25' N.	128° 53' W.	214	- 23	60	24	95	- 79	0.5	1.4	10.5
Havana, Cuba	23° 8' N.	82° 22' W.	161	72	82	77	95	50	2.9	4.8	48.0
Halifax, Nova Scotia	44° 39' N.	63° 36' W.	88	23	65	44	99	- 21	5.6	3.9	55.5
Helena, Montana	46° 22' N.	112° 0' W.	3,893	20	68	44	103	- 42	0.7	1.1	12.5
Honolulu, Hawaii	21° 19' N.	157° 52' W.	13	71	78	75	90	52	3.5	1.0	27.4
Juneau, Alaska	58° 18' N.	134° 24' W.	72	27	57	42	89	- 15	7.2	5.0	83.2
Los Angeles, Calif.	34° 3' N.	118° 15' W.	361	54	70	62	109	28	3.2	0.0	14.8
Mexico City, Mexico	19° 24' N.	99° 12' W.	7,575	54	63	60	92	24	0.5	6.7	29.4
Miami, Florida	25° 28' N.	80° 7' W.	8	66	82	76	96	27	2.4	5.3	59.2
Montgomery, Alabama	32° 30' N.	86° 20' W.	240	48	82	66	107	- 5	5.1	4.7	51.1
Montreal, Quebec	45° 30' N.	73° 35' W.	187	13	70	42	96	- 27	3.8	3.7	40.6
New Orleans, Louisiana	30° 0' N.	90° 30' W.	9	54	84	70	102	7	4.5	6.8	60.3
New York, New York	40° 25' N.	74° 0' W.	10	33	75	54	102	- 14	3.3	4.2	41.6
Nome, Alaska	64° 30' N.	165° 24' W.	14	3	50	25	84	- 47	1.1	2.6	17.8
Omaha, Nebraska	41° 16' N.	95° 56' W.	1,105	22	77	50	114	- 32	0.8	3.1	25.5
Phoenix, Arizona	33° 16' N.	112° 2' W.	1,114	51	90	72	118	16	0.8	1.0	7.6
St. Johns, Nfld.	45° 17' N.	66° 4' W.	125	23	59	41	92	- 21	5.4	3.7	53.8
Salt Lake City, Utah	40° 27' N.	111° 31' W.	4,220	29	78	54	105	- 20	1.3	0.6	15.8
San Francisco, Calif.	37° 27' N.	122° 16' W.	8	49	57	55	101	27	4.4	0.0	20.2
San Jose, Costa Rica	9° 58' N.	84° 2' W.	3,760	66	68	67	94	47	0.6	8.3	70.9
San Juan, Puerto Rico	18° 29' N.	66° 7' W.	100	75	80	78	94	62	4.1	5.7	60.5
Seattle, Washington	47° 27' N.	122° 15' W.	376	40	64	52	98	3	4.9	0.6	31.8
Spokane, Washington	47° 55' N.	117° 28' W.	1,943	27	70	48	108	- 30	1.8	0.5	14.6
Tampico, Mexico	22° 13' N.	97° 51' W.	59	66	82	76	—	—	1.5	4.9	44.9
Toronto, Ontario	43° 40' N.	97° 24' W.	379	22	69	45	103	- 28	2.7	2.9	32.3
Vancouver, B.C.	49° 17' N.	123° 5' W.	136	35	63	49	92	2	8.4	1.2	58.7
Veracruz, Mexico	19° 10' N.	96° 10' W.	49	71	82	77	96	49	0.4	14.8	68.0
Washington, D.C.	38° 54' N.	77° 3' W.	112	34	77	55	106	- 15	3.2	4.4	40.5
Winnipeg, Manitoba	49° 53' N.	97° 7' W.	760	- 3	67	35	103	- 46	0.9	3.2	20.4
South America											
Asunción, Paraguay	25° 21' S.	57° 35' W.	312	80	64	72	109	33	5.7	2.3	53.4
Bahia, Brazil	13° 0' S.	38° 31' W.	154	80	75	78	95	62	3.8	7.0	65.4
Belém, Brazil	1° 27' S.	48° 27' W.	33	78	79	79	95	64	9.2	3.1	94.1
Bogota, Colombia	4° 34' N.	74° 5' W.	8,678	56	57	58	—	—	2.3	2.0	41.6
Buenos Aires, Argentina	34° 40' S.	58° 30' W.	72	74	50	62	103	28	3.0	2.2	36.5
Caracas, Venezuela	10° 30' N.	66° 55' W.	3,420	69	72	71	91	45	0.9	4.8	31.9
Cayenne, Fr. Guiana	4° 58' N.	52° 18' W.	20	79	80	81	97	65	14.4	6.9	126.3
Ciudad Bolivar, Ven.	8° 8' N.	63° 33' W.	125	79	80	81	97	66	0.6	7.1	40.1
Cuzco, Peru	13° 33' S.	71° 53' W.	11,319	54	48	53	80	28	6.5	0.2	31.8
Georgetown, Br. Guiana	6° 50' N.	58° 12' W.	—	79	80	80	92	68	8.5	10.0	90.4
Guayaquil, Ecuador	2° 15' S.	79° 52' W.	16	79	75	78	—	—	9.7	0.4	39.0
La Paz, Bolivia	16° 30' S.	68° 9' W.	12,001	51	44	49	75	27	3.8	0.2	22.6
Lima, Peru	12° 2' S.	77° 2' W.	518	73	61	67	90	40	0.0	0.4	1.8
Manaus, Brazil	3° 10' S.	60° 0' W.	148	79	80	80	101	66	9.8	2.3	71.9
Maracaibo, Venezuela	10° 38' N.	71° 37' W.	26	81	85	83	102	68	0.1	2.2	22.2
Porto Alegre	30° 1' S.	51° 13' W.	37	77	57	67	105	28	4.2	4.3	48.5
Salta, Argentina	24° 46' S.	65° 28' W.	3,865	71	52	63	101	15	6.5	0.4	28.0
Santiago, Chile	33° 25' S.	70° 45' W.	1,703	68	47	56	99	24	0.0	3.4	14.4
São Paulo, Brazil	23° 33' S.	46° 38' W.	2,690	70.6	59	66	101	28	9.1	1.3	56.0
Valdivia, Chile	39° 46' S.	73° 12' W.	30	60	46	54	95	25	2.9	15.4	105.0

SOURCE: U.S. Department of Agriculture



TABLE XI

METROPOLITAN AREAS IN WESTERN HEMISPHERE WITH POPULATIONS OF 650,000 OR MORE

AREA	POPULATION	AREA	POPULATION
<b>South America</b>		Dayton, Ohio	694,623
Belo Horizonte, Brazil	693,328	Denver, Colorado	929,383
Bogotá, Colombia	1,200,000	Detroit, Michigan	3,762,360
Buenos Aires, Argentina	3,799,200	Houston, Texas	1,243,158
Caracas, Venezuela	1,336,119	Indianapolis, Indiana	697,567
Lima, Peru	1,730,000	Kansas City, Missouri-Kansas	1,039,493
Medellín, Colombia	650,000	Los Angeles-Long Beach, California	6,742,696
Montevideo, Uruguay	1,200,000	Louisville, Kentucky-Indiana	725,139
Recife, Brazil	797,234	Miami, Florida	935,047
Rio de Janeiro, Brazil	3,307,163	Milwaukee, Wisconsin	1,194,290
Rosario, Argentina	761,300	Minneapolis-St. Paul, Minnesota	1,482,030
Salvador, Brazil	655,735	Montreal, Quebec	2,109,509
Santiago, Chile	1,914,539	Newark, New Jersey	1,689,420
São Paulo, Brazil	3,850,000	New Orleans, Louisiana	868,480
<b>Mexico, Central America, and West Indies</b>		New York City, New York	10,694,633
Guadalajara, Mexico	737,346	Patterson-Clifton-Passaic, New Jersey	1,186,873
Havana, Cuba	1,158,203	Philadelphia, Pennsylvania-New Jersey	4,342,897
Mexico City, Mexico	4,829,402	Phoenix, Arizona	663,510
<b>United States and Canada</b>		Pittsburgh, Pennsylvania	2,405,435
Albany-Schenectady-Troy, New York	657,503	Portland, Oregon-Washington	821,897
Atlanta, Georgia	1,017,188	Providence-Pawtucket, Rhode Island-Massachusetts	816,148
Baltimore, Maryland	1,727,023	St. Louis, Missouri-Illinois	2,060,103
Boston, Massachusetts	2,589,301	San Antonio, Texas	687,151
Buffalo, New York	1,306,957	San Bernardino-Riverside-Ontario, California	809,782
Chicago, Illinois	6,220,913	San Diego, California	1,033,011
Cincinnati, Ohio-Kentucky	1,071,624	San Francisco-Oakland, California	2,783,359
Cleveland, Ohio	1,796,595	Seattle, Washington	1,107,213
Columbus, Ohio	682,962	Tampa-St. Petersburg, Florida	772,453
Dallas, Texas	1,083,601	Toronto, Ontario	1,824,481
		Vancouver, British Columbia	790,165
		Washington, D.C.-Maryland-Virginia	2,001,897

SOURCE: *World Almanac 1964*



# INDEX

The letters below are marked to help show their sounds. They will help you in pronouncing the words in the Index correctly.

ă hat, cap	ä father, far	ē deep, eat	ĩ it, spin	ō open, go	ù put, foot
ā age, face	à sofa, about	èr maker, learn	ī ice, five	ô order, all	ü rule, cool
ã care, hair	ě let, best	ēr shirt, burn	õ hot, rock	ũ cup, butter	ū use, music

The diacritical markings used here (with the exception of the short vowel marking) are the same as those used in the Thorndike-Barnhart Dictionaries; copyright, 1952 by Scott, Foresman and Company, N.Y.

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